



Tennessee Valley Authority, Post Office Box 2000, Soddy Daisy, Tennessee 37384-2000

June 24, 2015

10 CFR 50.4

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Sequoyah Nuclear Plant, Units 1 and 2  
Facility Operating License Nos. DPR-77 and DPR-79  
NRC Docket Nos. 50-327 and 50-328

**Subject: National Pollutant Discharge Elimination System (NPDES) Permit  
No. TN0026450 Approved Changes**

The enclosure provides the approved changes to Sequoyah Nuclear Plant (SQN) NPDES Permit No. TN0026450 as required by SQN Environmental Technical Specification (ETS) Section 5.5.2, Changes in Permits and Certifications. The Permit was originally renewed and issued on May 1, 2015, with a correction issued on June 2, 2105. This letter submits the corrected Permit.

The SQN ETS, Section 5.5.2, "Changes in Permits and Certifications," requires in part that changes in "Federal (other than NRC), State, local, and regional authority permits and certificates for the protection of the environment shall be reported to the NRC within 30 days." The May 1, 2015 NPDES Permit change was not submitted within the required timeframe. This issue has been entered in the SQN's Corrective Action Program.


The enclosure contains the SQN NPDES Permit No. TN0026450 as corrected from the State of Tennessee, Department of Environmental and Conservation Division of Water Resources.

COO/  
MLR

U.S. Nuclear Regulatory Commission  
Page 2  
June 24, 2015

There are no regulatory commitments associated with this submittal. If you have any questions concerning this matter please contact Erin Henderson at (423) 843-7170.

Respectfully,



John T. Carlin  
Site Vice President  
Sequoyah Nuclear Plant

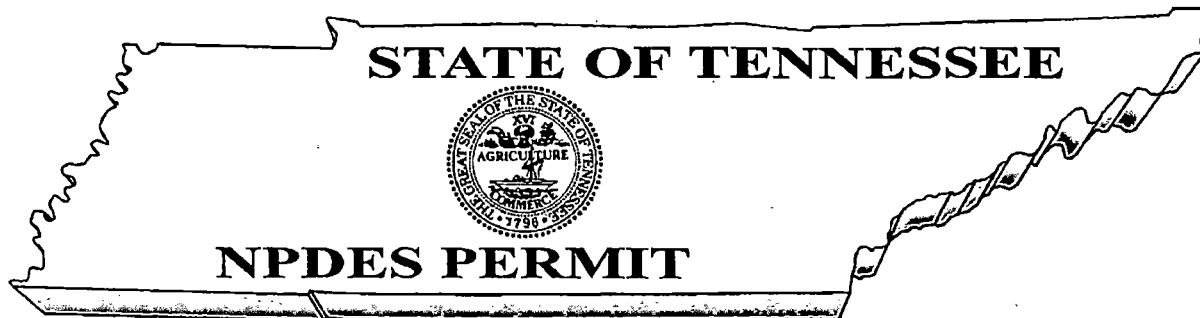
Enclosure:  
NPDES Permit No. TN0026450

cc (Enclosure):  
NRC Regional Administrator – Region II  
NRC Senior Resident Inspector – Sequoyah Nuclear Plant

**ENCLOSURE**

**TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT (SQN)**

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSYTEM (NPDES)  
PERMIT NO. TN0026450**



**No. TN0026450**

Authorization to discharge under the  
National Pollutant Discharge Elimination System (NPDES)

Issued By

**Tennessee Department of Environment and Conservation  
Division of Water Resources  
Rosa L. Parks Blvd.  
11th Floor, TN Tower  
Nashville, Tennessee 37243-1534**

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger: **TVA – SEQUOYAH NUCLEAR PLANT**

is authorized to discharge: process and non-process wastewater through Outfalls 101, 110, 116, 117, and 118, and Internal Monitoring Points (IMP) 103, and 107

from a facility located: **in Soddy Daisy, Hamilton County, Tennessee**  
to receiving waters named: **Tennessee River at mile 483.65 (Outfalls 101 & 110), 485.2 (Outfall 116), 484.852 (Outfall 117), and 484.8 (Outfall 118)**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on: **June 1, 2015**

This permit shall expire on: **December 31, 2018**

Issuance date: **May 1, 2015**

for Tisha Calabrese Benton  
Director

*This TN-NPDES permit also constitutes the State's certification under Section 401 of the Clean Water Act for the purpose of obtaining any federal license for activities resulting in discharges covered under the TN-NPDES permit.*

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## PART I

### A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

#### 1. Outfall 101 – Diffuser Pond

TVA - Sequoyah Nuclear Plant is authorized to discharge process and non-process wastewater (condenser circulating water, essential raw cooling water, cooling tower blowdown, raw cooling water, low volume wastes, miscellaneous low volume wastes, including various facilities drains and sumps, A/C condensate, steam generator blowdown, high pressure fire protection water, regeneration wastes from condensate demineralizer and stormwater runoff) through Outfall 101 to the Tennessee River at mile 483.65. The discharge shall be limited and monitored by the permittee as specified below:

Feature Description : External Outfall, Number : 101

Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Chlorine, total residual	<=	0.1	mg/L	Calculated <sup>1</sup>	5/week	Daily Maximum
Chlorine, total residual	<=	0.1	mg/L	Calculated	5/week	Monthly Average
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Recorder	Continuous	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Calculated	Daily	Monthly Average
Temperature, water deg. centigrade	Report	-	deg C	Recorder	Continuous	Daily Maximum
IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>=	42.8	%	Composite	Monthly	Minimum
IC25 Static Renewal 7 Day Chronic Pimephales	>=	42.8	%	Composite	Monthly	Minimum

Monitoring : Effluent Gross, Season : Winter

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temp. Diff. between samp. & upstrm deg. C	<=	5.0	deg C	Calculated	Continuous	Daily Maximum

Monitoring : Instream Monitoring, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temperature rate of change deg. C/hr	<=	2.0	deg C/hr	Calculated	Continuous	Daily Maximum
Temperature, water deg. centigrade	<=	30.5	deg C	Calculated	Continuous	Daily Maximum

Monitoring : Instream Monitoring, Season : Summer

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temp. Diff. between samp. & upstrm deg. C	<=	3.0	deg C	Calculated	Continuous	Daily Maximum

Samples taken in compliance with the monitoring requirements specified above shall be taken as follows: effluent flow – sampled at diffuser gate prior to entry to the Tennessee River;

ambient temperature - from station 14 located at TN River mile 490.5 upstream of SQN. Downstream river temperature, temperature rise and rate of temperature change shall be determined by numerical model.

WET testing frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring monthly reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP; monitoring not required (or MNR) shall be reported on the discharge monitoring reports (DMRs) or the electronic report (if being used) to reflect that monitoring is not required.

See Part III of this permit for further description of toxicity tests.

The Sample Type reported for Total Residual Chlorine may be obtained using a grab sample in lieu of a calculated value. TRC analysis shall be performed within fifteen (15) minutes of sample collection.

The acceptance methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136, as amended. The method detection level (MDL) for TRC shall not exceed 0.08 mg/L unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. Under the renewed permit limits, reporting of TRC at less than 0.08 mg/L shall be interpreted to constitute compliance with the permit.

The use of polymers/coagulants is authorized when utilized in a way that does not cause/contribute to toxicity in the discharge.

The following requirements also apply to discharges from Outfall 101:

- a. Compliance with the river limitations (river temperature, temperature rise, and rate of temperature change) shall be monitored by means of a numerical model that solves the thermohydrodynamic equations governing the flow and thermal conditions in the reservoir. This numerical model will utilize measured values of the upstream temperature profile and river stage; flow, temperature and performance characteristics of the diffuser discharge; and river flow as determined from releases at the Watts Bar and Chickamauga Dams. In the event that the modeling system described here is out of service, an alternate method will be employed to measure water temperatures at least one time per day and verify compliance of the maximum river temperature and maximum temperature rise.
- b. Depth average measurements can be taken at a backup temperature monitor at the downstream end of the diffuser mixing zone (left bank Tennessee River Mile 483.4, Station 8) or by grab sampling from boats. Boat sampling will include average 5-foot depth measurements (average of 3, 5, and 7-foot depths). Sampling from a boat shall be made at Station 14, at about Tennessee River Mile 490.5 (ambient temperature) and at quarter points and mid-channel at Tennessee River Mile 483.4 (downstream temperature). The downstream reported value will be a depth (3, 5, and 7 foot) and lateral (quarter points and midpoint) average of the instream measurements. Monitoring in the alternative mode using boat sampling shall not be required when unsafe boating conditions occur.
- c. Compliance with river temperature, temperature rise, and rate of temperature change limitations shall be applicable at the edge of a mixing zone which shall not exceed the following dimensions: (1) a maximum length of 1500 feet downstream of the diffusers,



(2) a maximum width of 750 feet, and (3) a maximum length of 275 feet upstream of the diffusers. The depth of the mixing zone measured from the surface varies linearly from the surface 275 feet upstream of the diffusers to the top of the diffuser pipes and extends to the bottom downstream of the diffusers. When the plant is operated in closed mode, the mixing zone shall also include the area of the intake forebay.

- d. Information required by the numerical model and evaluations for the river temperature, temperature rise, and rate of temperature change shall be made every 15 minutes. The ambient temperature shall be determined at the 5-foot depth as the average of measurements at depths 3 feet, 5 feet, and 7 feet. The river temperature at the downstream end of the mixing zone shall be determined as that computed by the numerical model at a depth of 5 feet.
- e. Daily maximum temperatures for the ambient temperature, the river temperature at the downstream edge of the mixing zone, and temperature rise shall be determined from 24-hour average values. The 24-hour average values shall be calculated every 15 minutes using the current and previous ninety-six 15-minute values, thus creating a 'rolling' average. The maximum of the ninety-six observations generated per day by this procedure shall be reported as the daily maximum value. For the river temperature downstream end of the mixing zone, the 1-hour average shall also be determined. The 1-hour average values shall be calculated every 15 minutes using the average of the current and previous four 15-minute values, again creating a rolling average.
- f. The daily maximum 24-hour average river temperature is limited to 30.5°C. Since the state's criteria makes exception for exceeding the value as a result of natural conditions, where the 24-hour average ambient temperature exceeds 29.4°C and the plant is operated in helper mode<sup>2</sup> the maximum temperature may exceed 30.5°C. In no case shall the plant discharge cause the 1-hour average river temperature at the downstream edge of the mixing zone to exceed 33.9°C without the consent of the permitting authority.
- g. The temperature rise is the difference between the 24-hour average ambient river temperature and the 24-hour average temperature at the downstream edge of the mixing zone. The 24-hour average temperature rise shall be limited to 3.0 C° during the months of April through October. The 24-hour average temperature rise shall be limited to 5.0 C° during the months of November through March.
- h. The rate of temperature change shall be computed at 15-minute intervals based on the current 24-hour average ambient river temperature, current 24-hour average river flow, and current 15-minute values of flow and temperature of water discharging through the diffuser pipes. The 1-hour average rate of temperature change shall be calculated every 15-minutes by averaging the current and previous four 15-minute values. The 1-hour average rate of temperature change shall be limited to 2 C° per hour.
- i. During periods when the Essential Raw Cooling Water (ERCW) and/or Raw Cooling Water (RCW) systems are receiving applications of biocides, (oxidizing or non-oxidizing), chemical dispersants, or detoxicant chemical additives, the permittee shall implement the Biocide/Corrosion Treatment Plan (B/CTP), which was approved April 27, 2005, and all subsequent revisions as approved by the Division. The B/CTP [plan] for these activities describes the specific chemical additive, material feed rate, method

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<sup>2</sup> Helper Mode is defined as the treatment of at least part of the plant effluent by the cooling towers.

detection level (MDL) for the active compound(s), and the allowable concentration and/or mass limits, and actions proposed to ensure compliance with established effluent limitations during application. The B/CTP refers to the NPDES permit for specific language associated with monitoring Total Residual Chlorine (TRC). Note: the term TRC will encompass all references to any oxidants (i.e. chlorine/bromine) in use at the SQN facility; therefore, the acronym "TRO" may be used interchangeably. WET frequency and results reporting will be governed by the B/CTP. The permit table for Outfall 101 will state that WET testing frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring monthly, reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP; monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or the electronic report (if being used) to reflect that monitoring is not required.

- j. Total Residual Chlorine shall be sampled downstream of the chlorine injection points but prior to mixing with any other waste streams. TRC shall be calculated for the diffuser discharge (Outfall 101) based on these analyses and the proportional flows of the Condenser Circulating Water (CCW), ERCW, and RCW systems to indicate whether permit limits may be in danger of being exceeded. This calculation is a simple dilution calculation to project the maximum amount of chlorine that could be present at the discharge. The calculation will not allow for the decay of residual chlorine. If the CCW system is to be chlorinated or chlorination of the ERCW and/or RCW system is to occur while none of the units are discharging flow from the CCW system (i.e. zero CCW pumps in service), the B/CTP shall be revised and submitted to the Division for approval prior to initiation of the changes.
- k. Any substance, including radioactive materials, is of interest to our Agency if it has reasonable potential to exceed applicable water quality criteria. However, radioactive releases to the environment, notwithstanding point source discharges authorized via this permit, are not regulated under the Clean Water Act, but are instead **regulated under the Nuclear Regulatory Commission (NRC) by issuance of an Operating License**. Pertinent regulations are found under 10 CFR Part 20 and 10 CFR Part 50. Sequoyah Nuclear Plant effluents that may contain radioactive material are not addressed as part of the NPDES permitting process.

## 2. Internal Monitoring Point (formerly Outfall) 103

TVA-Sequoyah Nuclear Plant is authorized to discharge wastewater from the Low Volume Waste Treatment Pond through an internal monitoring point, IMP103 discharges into the Diffuser Pond, which finally discharges through Outfall 101. Wastewater consists of various flows including condensate demineralizer, turbine building sump, stormwater from IMP 107, essential raw cooling water, raw cooling water and storm water runoff.

This discharge shall be limited and monitored by the permittee as specified below:

**Description : Internal Outfall, Number : 103, Monitoring : Effluent Gross, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Instantaneous	Weekly	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Instantaneous	Weekly	Monthly Average

Oil & Grease	<=	20.0	mg/L	Grab	Monthly	Daily Maximum
Oil & Grease	<=	15.0	mg/L	Grab	Monthly	Monthly Average
Solids, total suspended	<=	100.0	mg/L	Grab	Monthly	Daily Maximum
Solids, total suspended	<=	30.0	mg/L	Grab	Monthly	Monthly Average
pH	<=	9.0	SU	Grab	Weekly	Maximum
pH	>=	6.0	SU	Grab	Weekly	Minimum

**Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: low volume treatment pond discharge prior to mixing with other waste streams.**

In the event that the turbine building sump is discharged directly to the CCW channel or the yard drainage pond, TSS, Oil and Grease and pH shall be monitored 1/Week.

### 3. Internal Monitoring Point (formerly Outfall) 107

TVA Sequoyah Nuclear Plant is authorized to discharge rain water from the Metal Cleaning Waste Treatment Ponds to the Low Volume Waste Treatment Pond, (IMP103), the Yard Drainage Pond, or the Condenser Cooling Water Channel, which ultimately discharges into the Diffuser Pond (Outfall101). **The permittee is not required to monitor discharge through IMP 107 for routine decanting of accumulated stormwater.**

During the process of closing the Metal Cleaning Waste Treatment Ponds, all monitoring requirements at IMP107 shall be waived to facilitate complete dewatering. During the dewatering process, samples shall be collected at Outfall 101 for analysis of TSS, O&G, copper, iron, and flow to ensure the water quality of the receiving stream is protected. Due to the additional residence time within the Diffuser Pond, these parameters shall be monitored daily at Outfall 101 from the beginning of the dewatering event(s) through three days following termination of dewatering. All monitoring results shall be reported in the DMR for Outfall 101.

### 4. Outfall 110

Outfall 110 which has been inactive for 18 years remains in the event the plant goes into closed mode. TVA - Sequoyah Nuclear Plant is authorized to discharge backwash wastewater through Outfall 110, to the cooling channel and intake forebay. Note that Outfall 110 is not normally used in day-to-day operations of the plant and effluent limitations and monitoring requirements are applicable only during periods of closed-mode operation. However, should conditions apply that require its use as the main discharge point in place of Outfall 101 the same requirements of Outfall 101 shall apply to Outfall 110.

### 5. Outfall 116 and 117

TVA - Sequoyah Nuclear Plant is authorized to discharge backwash wastewater through Outfall 116 to the Tennessee River at mile 485.2 and through Outfall 117 to the

Tennessee River at mile 484.85. There are no limits or monitoring requirements for these discharges.

## 6. Outfall 118

TVA - Sequoyah Nuclear Plant is authorized to discharge settling pond water and storm water runoff (only applicable when the pond is in service) through Outfall 118 to the intake forebay at Tennessee River mile 484.8.

These discharges shall be limited and monitored by the permittee as specified below:

Description : External Outfall, Number : 118, Monitoring : Effluent Gross, Season : All Year

Parameter	Qualifier	Limit	Unit	Sample Type	Frequency	Statistical base
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Estimate	Once Per Batch	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Estimate	Once Per Batch	Monthly Average
Oxygen, dissolved (DO)	>=	2.0	mg/L	Grab	Twice Every Week	Minimum
Solids, settleable	<=	1.0	mL/L	Grab	Monthly	Daily Maximum
Solids, total suspended	<=	100.0	mg/L	Grab	Twice Every Week	Daily Maximum

There shall be no discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts

Samples taken in compliance with the monitoring requirements specified above shall be taken of a discharge from the settling pond prior to mixing with the Intake Forebay.

Grab samples shall be taken at these frequencies, including a grab sample taken immediately prior to termination of the batch discharge.

These effluent limitations and monitoring requirements only apply at times when this settling pond is in use as a settling basin for dredged sediment. Best Management Practices (BMP) shall be used to control runoff from the pond. Examples include vegetative cover, silt fences, and/or hay bales.

## 7. Additional monitoring requirements and conditions applicable to all Outfalls include:

- Flow shall be reported in Million Gallons per Day (MGD)
- No discharge of polychlorinated biphenyl compounds (PCB) is allowed under this permit.
- There shall be no distinctly visible floating scum, solids, oil sheen, visible foam, and other floating matter discharged with the wastewater to the receiving stream. The wastewater discharge must not cause an **objectionable color contrast in the receiving stream.**
- The wastewater discharge shall not contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

- e) Sludge or any other material removed by any treatment works must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.
- f) Priority Pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the Priority Pollutants will not be required unless making application for new NPDES permit.

## **B. MONITORING PROCEDURES**

### **1. Representative Sampling**

Samples and measurements taken in compliance with the monitoring requirements specified herein shall be representative of the volume and nature of the monitored discharge, and shall be taken after treatment and prior to mixing with uncontaminated storm water runoff or the receiving stream.

### **2. Sampling Frequency**

Where the permit requires sampling and monitoring of a particular effluent characteristic(s) at a frequency of less than once per day or daily, the permittee is precluded from marking the "No Discharge" block on the Discharge Monitoring Report if there has been any discharge from that particular outfall during the period which coincides with the required monitoring frequency, i.e. if the required monitoring frequency is once per month or 1/month, the monitoring period is one month, and if the discharge occurs during only one day in that period then the permittee must sample on that day and report the results of analyses accordingly.

### **3. Test Procedures**

- a. Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.
- b. Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR, Part 136, as amended, and promulgated pursuant to Section 304 (h) of the Act.
- c. The acceptable methods for analysis of TRC are any methods specified in Title 40, CFR Part 136. The method detection level (MDL) for TRC shall not exceed 0.05mg/L unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL, and shall have that documentation available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit.

### **4. Recording of Results**

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The exact place, date and time of sampling;
- b. The exact person(s) collecting samples;
- c. The dates and times the analyses were performed;
- d. The person(s) or laboratory that performed the analyses;
- e. The analytical techniques or methods used, and;
- f. The results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of three (3) years, or longer, if requested by the Division of Water Resources.

C. DEFINITIONS

The **Daily Maximum Concentration** is a limitation on the average concentration, in milligrams per liter (mg/L), of the discharge during any calendar day. When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite; when other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

**Daily Maximum Temperature** is the largest of the ninety-six 15-minute (instantaneous) temperature readings for the day.

The **Monthly Average Concentration**, a limitation on the discharge concentration, in milligrams per liter (mg/L), is the arithmetic mean of all daily concentrations determined in a one-month period. For the purpose of this definition, a frequency of 2/Month is representative of 2 separate daily samples, each sample having been collected on a separate day during the monitoring period.

The **Monthly Average Amount**, a discharge limitation measured in pounds per day (lb/day), is the total amount of any pollutant in the discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by a permit, the monthly average amount shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made. For the purpose of this definition, a frequency of 2/Month is representative of 2 separate daily samples, each sample having been collected on a separate day during the monitoring period.

The **Daily Maximum Amount** is a limitation measured in pounds per day (lb/day), on the total amount of any pollutant in the discharge by weight during any calendar day.

The **Instantaneous Concentration** is a limitation on the concentration, in milligrams per liter (mg/L), of any pollutant contained in the discharge determined from a grab sample taken at any point in time.

For the purpose of this permit a **Totalizer** is a device or meter that continuously measures and calculates (adds) total flows in gallons, million gallons, cubic feet, or some other unit of volume measurement.

For the purposes of this permit, a **Composite Sample\*** for non-storm water discharges is a sample composed of equal aliquots collected at the rate of at least once per hour at regular time intervals over the period of discharge in a 24-hour period and combined into a single sample. A composite sample may also be a sample collected continuously over a period of 24 hours at a rate proportional to the flow. (\*Except for sampling associated with Biomonitoring; use procedures for sampling from EPA-821-R-02-013, or most current edition.)

**Continuous Discharge:** A routine release to the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc.

**Continuous Monitoring:** the measurement of temperature at a frequency that will accurately characterize the nature of discharges from the site and water in the receiving stream. Samples collected continuously shall be at a frequency of not less than once every fifteen minutes for temperature.

For the purpose of this permit a **Recorder** is a device that makes a graph or other automatic record of the stage, pressure, depth, velocity, or the movement or position of water controlling devices, usually as a function of time.

A **Grab Sample**, for the purposes of this permit, is defined as a single effluent sample of at least 100 milliliters collected over a period not exceeding 15 minutes. The sample(s) shall be collected at the period(s) most representative of the total discharge.

For the purpose of this permit, a **Calendar Day** is defined as any 24-hour period.

**Weekly** means the period from Monday through Sunday. For reporting purposes, a calendar week that contains a change of month shall be considered part of the latter month.

For the purpose of this permit, a **Quarter** is defined as any one of the following three month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, or October 1 through December 31.

For the purpose of this permit, **Semi-annually** means the same as "once every six months." Measurements of the effluent characteristics concentrations may be made anytime during a 6 month period beginning from the issuance date of this permit so long as the second set of measurements for a given 12 month period are made approximately 6 months subsequent to that time, if feasible.

For the purpose of this permit, **Annually** is defined as a monitoring frequency of once every twelve (12) months beginning with the date of issuance of this permit so long as the following set of measurements for a given 12 month period are made approximately 12 months subsequent to that time.

## D. REPORTING

### 1. Monitoring Results

Monitoring results shall be recorded monthly and submitted monthly using Discharge Monitoring Report (DMR) forms supplied by the Division of Water Resources or comparable forms provided by the permittee, and approved by the Division of Water Resources. Submittals shall be postmarked no later than 15 days after the completion of the reporting period. The top two copies of each report are to be submitted. A copy should be retained for the permittee's files. DMRs and any communication regarding compliance with the conditions of this permit must be sent to:

**TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION**

**DIVISION OF WATER RESOURCES**

**COMPLIANCE REVIEW SECTION**

**312 Rosa L. Parks Blvd.**

**NASHVILLE TN 37243-1534**

The first DMR is due on the fifteenth of the month following permit effectiveness.

DMRs and any other information or report must be signed and certified by a responsible corporate officer as defined in 40 CFR 122.22, a general partner or proprietor, or a principal municipal executive officer or ranking elected official or his duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.

The electronic submission of DMRs shall be accepted only if approved in writing by the division. For purposes of determining compliance with this permit, data submitted in electronic format is legally equivalent to data submitted on signed and certified DMR forms.

**2. Additional Monitoring by Permittee**

If the permittee monitors any pollutant specifically limited by this permit more frequently than required at the location(s) designated, using approved analytical methods as specified herein, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form. Such increased frequency shall also be indicated on the form.

**3. Falsifying Reports**

Knowingly making any false statement on any report required by this permit may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

**4. Outlier Data**

Outlier data include analytical results that are probably false. The validity of results is based on operational knowledge and a properly implemented quality assurance program. False results may include laboratory artifacts, potential sample



tampering, broken or suspect sample containers, sample contamination or similar demonstrated quality control flaw.

Outlier data are identified through a properly implemented quality assurance program, and according to ASTM standards (e.g. Grubbs Test, 'h' and 'k' statistics). Furthermore, outliers should be verified, corrected, or removed, based on further inquiries into the matter. If an outlier was verified (through repeated testing and/or analysis), it should remain in the preliminary data set. If an outlier resulted from a transcription or similar clerical error, it should be corrected and subsequently reported.

Therefore, only if an outlier was associated with problems in the collection or analysis of the samples, and as such does not conform with the Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR §136), it can be removed from the data set and not reported on the Discharge Monitoring Report forms (DMRs). Otherwise, all results (including monitoring of pollutants more frequently than required at the location(s) designated, using approved analytical methods as specified in the permit) should be included in the calculation and reporting of the values required in the DMR form. The permittee is encouraged to use "comment" section of the DMR form (or attach additional pages), in order to explain any potential outliers or dubious results.

#### **E. SCHEDULE OF COMPLIANCE**

Full compliance and operational levels shall be attained from the effective date of this permit.

## **PART II – TERMS AND CONDITIONS**

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### **A. GENERAL PROVISIONS**

#### **1. Duty to Reapply**

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Resources (the "Director") no later than 180 days prior to the expiration date. Such applications must be properly signed and certified.

#### **2. Right of Entry**

The permittee shall allow the Director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials:

- a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;
- b. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and
- c. To sample at reasonable times any discharge of pollutants.

#### **3. Availability of Reports**

Except for data determined to be confidential under Section 308 of the Federal Water Pollution Control Act, as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Resources. As required by the Federal Act, effluent data shall not be considered confidential.

#### **4. Proper Operation and Maintenance**

- a. The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.
- b. Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT and or other technology-based effluent limitations such as those in State of Tennessee Rule 0400-40-05-.03.

5. Treatment Facility Failure

The permittee, in order to maintain compliance with this permit, shall control production, all discharges, or both, upon reduction, loss, or failure of the treatment facility, until the facility is restored or an alternative method of treatment is provided. This requirement applies in such situations as the reduction, loss, or failure of the primary source of power.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

7. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

8. Other Information

If the permittee becomes aware that he failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he shall promptly submit such facts or information.

**B. CHANGES AFFECTING THE PERMIT**

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

- a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
- b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a) (1).

2. Permit Modification, Revocation, or Termination

- a. This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR 122.62 and 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended.
- b. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

c. If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the Director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit on the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.

d. The filing of a request by the permittee for a modification, revocation, reissuance, termination, or notification of planned changes or anticipated noncompliance does not halt any permit condition.

### 3. Change of Ownership

This permit may be transferred to another party (provided there are neither modifications to the facility or its operations, nor any other changes which might affect the permit limits and conditions contained in the permit) by the permittee if:

a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

b. The notice includes a written agreement between the existing and new permittee's containing a specified date for transfer of permit responsibility, coverage, and liability between them; and

c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

Pursuant to the requirements of 40 CFR 122.61, concerning transfer of ownership, the permittee must provide the following information to the division in their formal notice of intent to transfer ownership: 1) the NPDES permit number of the subject permit; 2) the effective date of the proposed transfer; 3) the name and address of the transferor; 4) the name and address of the transferee; 5) the names of the responsible parties for both the transferor and transferee; 6) a statement that the transferee assumes responsibility for the subject NPDES permit; 7) a statement that the transferor relinquishes responsibility for the subject NPDES permit; 8) the signatures of the responsible parties for both the transferor and transferee pursuant to the requirements of 40 CFR 122.22(a), "Signatories to permit applications"; and, 9) a statement regarding any proposed modifications to the facility, its operations, or any other changes which might affect the permit limits and conditions contained in the permit.

### 4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

### C. NONCOMPLIANCE

#### 1. Effect of Noncompliance

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable State and Federal laws and is grounds for enforcement action permit termination, permit modification, or denial of permit reissuance.

#### 2. Reporting of Noncompliance

##### a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate Environmental Field Office within 24-hours from the time the permittee becomes aware of the circumstances. (The Environmental Field Office should be contacted for names and phone numbers of environmental response personnel).

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

- i. A description of the discharge and cause of noncompliance;
- ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
- iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

##### b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.a. above, the permittee shall report the noncompliance on the Discharge Monitoring Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

#### 3. Overflow

- a. "**Overflow**" means the discharge to land or water of wastes from any portion of the collection, transmission, or treatment system other than through permitted outfalls.
- b. Overflows are prohibited.
- c. The permittee shall operate the collection system so as to avoid overflows. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system.

- d. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report submitted to the local TDEC Environmental Field Office. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.
- e. In the event that more than five (5) overflows have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium or completion of the actions identified in this paragraph, the permittee may request a meeting with the Division of Water Resources EAC staff to petition for a waiver based on mitigating evidence.

#### 4. Upset

- a. **"Upset"** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:
  - i. An upset occurred and that the permittee can identify the cause(s) of the upset;
  - ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;
  - iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and
  - iv. The permittee complied with any remedial measures required under "Adverse Impact."

#### 5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

6. Bypass

- a. **"Bypass"** is the intentional diversion of wastewater away from any portion of a treatment facility. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which would cause them to become inoperable, or substantial and permanent loss of natural resources, which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- b. Bypasses are prohibited unless the following 3 conditions are met:
  - i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;
  - ii. There are not feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass, which occurred during normal periods of equipment down time or preventative maintenance;
  - iii. The permittee submits notice of an unanticipated bypass to the Division of Water Resources in the appropriate environmental Field Office within 24-hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the Director, if possible, at least 10 days before the date of the bypass.
- c. Bypasses not exceeding limitations are allowed only if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 6.b.iii, above.

**D. LIABILITIES**

1. Civil and Criminal Liability

Except as provided in permit conditions for **"Bypassing," "Overflow,"** and **"Upset,"** nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or the Federal Water Pollution Control Act, as amended.

### **PART III - OTHER REQUIREMENTS**

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#### **A. TOXIC POLLUTANTS**

The permittee shall notify the Division of Water Resources as soon as it knows or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic substance(s) (listed at 40 CFR 122, Appendix D, Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

- a. One hundred micrograms per liter (100 ug/l);
- b. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
- c. Five (5) times the maximum concentration value reported for that pollutant(s) in the permit application in accordance with 122.21(g) (7); or
- d. The level established by the Director in accordance with 122.44(f).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

- a. Five hundred micrograms per liter (500 ug/l);
- b. One milligram per liter (1 mg/L) for antimony;
- c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 122.21(g)(7); or
- d. The level established by the Director in accordance with 122.44(f).

#### **B. REOPENER CLAUSE**

If an applicable standard or limitation is promulgated under Sections 301(b) (2) (C) and (D), 304(B) (2), and 307(a) (2) and that effluent standard or limitation is more stringent than any effluent limitation in the permit or controls a pollutant not limited in the permit, the permit shall be promptly modified or revoked and reissued to conform to that effluent standard or limitation.

#### **C. PLACEMENT OF SIGNS**

Within sixty (60) days of the effective date of this permit, the permittee shall place and maintain a sign(s) at each outfall and any bypass/overflow point in the collection system. The sign(s) should be clearly visible to the public from the bank and the receiving stream or from the nearest public property/right-of-way, if applicable. The



minimum sign size should be two feet by two feet (2' x 2') with one inch (1") letters. The sign should be made of durable material and have a white background with black letters.

The sign(s) are to provide notice to the public as to the nature of the discharge and, in the case of the permitted outfalls, that the discharge is regulated by the Tennessee Department of Environment and Conservation, Division of Water Resources. The following is given as an example of the minimal amount of information that must be included on the sign:

<p><b>TREATED INDUSTRIAL WASTEWATER</b> <b>TVA - Sequoyah Nuclear Plant</b> <b>(Permittee's Phone Number)</b> <b>NPDES Permit NO. TN0026450</b> <b>TENNESSEE DIVISION OF WATER RESOURCES</b> <b>1-888-891-8332 CHATTANOOGA-ENVIRONMENTAL FIELD OFFICE</b></p>
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#### **D. ANTIDegradation**

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06, titled "Tennessee Antidegradation Statement," and in consideration of the Department's directive in attaining the greatest degree of effluent reduction achievable in municipal, industrial, and other wastes, the permittee shall further be required, pursuant to the terms and conditions of this permit, to comply with the effluent limitations and schedules of compliance required to implement applicable water quality standards, to comply with a State Water Quality Plan or other State or Federal laws or regulations, or where practicable, to comply with a standard permitting no discharge of pollutants.

#### **E. BIOMONITORING REQUIREMENTS, CHRONIC**

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow (*Pimephales promelas*) Larval Survival and Growth Test on samples of final effluent from Outfall 101. Sampling shall be representative of the discharges made. The permittee shall try to arrange some samples for the biomonitoring testing to coincide with the intermittent application of chemicals so that there are toxicity test results that reflect seasonal variations in chemical treatments.

The measured endpoint for toxicity shall be the inhibition concentration causing 25% reduction (IC25) in survival, reproduction, or growth of the test organisms. The IC25 shall be determined based on a 25% reduction as compared to the controls. The average reproduction and growth responses shall be determined based on the number of *Ceriodaphnia dubia* or *Pimephales promelas* larvae used to initiate the test. A separate statistical analysis based on survival information is not required.

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
100% Effluent	2 X ML	Monitoring Limit (ML)	0.50 X ML	0.25 X ML	Control
% effluent					
100	85.6	42.8	21.4	10.7	0

The dilution/control water used will be moderately hard water as described in Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013 (or the most current edition). Results from a chronic standard reference toxicant quality assurance test for each species tested shall be submitted with the discharge monitoring report. Reference toxicant tests shall be conducted as required in EPA-821-R-02-013 (or the most current edition). Additionally, the analysis of this multi-concentration test shall include review of the concentration-response relationship to ensure that calculated test results are interpreted appropriately.

Toxicity will be demonstrated if the IC25 is less than the monitoring limit indicated for each outfall in the above table(s). Toxicity demonstrated by the tests specified herein will serve as a hard trigger for accelerated biomonitoring. However, if raw water intake samples (tested concurrently with the effluent samples) are shown to be toxic enough to represent a test failure (100 percent samples statistically less than controls using t-tests and minnow growth or daphnia reproduction is 25 percent less than controls) and if effluent toxicity is not statistically greater than calculated intake toxicity, the effluent toxicity test in question will be considered invalid. In the event these two above described conditions occur, the toxicity test shall be repeated according to the schedule requirements for test failure. Effluent toxicity that is not consistent with the intake toxicity conditions specified above will serve as a hard trigger for accelerated biomonitoring.

All tests will be conducted using a minimum of three 24-hour flow-proportionate composite samples of final effluent (e.g., collected on days 1, 3 and 5). If, in any control more than 20% of the test organisms die in 7 days, the test (control and effluent) is considered invalid and the test shall be repeated within 30 days of the date the initial test is invalidated. Furthermore, if the results do not meet the acceptability criteria of section 4.9.1, EPA-821-R-02-013 (or the most current edition), or if the required concentration-response review fails to yield a valid relationship per guidance contained in Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing, EPA-821-B-00-004 (or the most current edition), that test shall be repeated. Any test initiated but terminated before completion must also be reported along with a complete explanation for the termination.

The toxicity tests specified herein for Outfall 101 shall be conducted according to the B/CTP and begin during the first chemical application requiring biomonitoring following the effective date of this permit. WET frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring, monthly reporting shall continue. For monitoring periods when WET testing is not required by the

approved B/CTP, monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or electronic report (if being used) to reflect that monitoring is not required.

**In the event of a test failure**, the permittee must start a follow-up test within 2 weeks and submit results from a follow-up test within 30 days from obtaining initial WET testing results. The follow-up test must be conducted using the same serial dilutions as presented in the corresponding table(s) above. The follow-up test will not negate an initial failed test. In addition, **the failure of a follow-up test will constitute a hard trigger for accelerated biomonitoring, which must also be reported.**

In the event of 2 consecutive test failures or 3 test failures within a 12-month period for the same outfall, the permittee must initiate a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) study within 30 days and so notify the division by letter. This notification shall include a schedule of activities for the initial investigation of that outfall. **During the term of the TIE/TRE study, the frequency of biomonitoring shall be once every three months.** Additionally, the permittee shall submit progress reports once every three months throughout the term of the TIE/TRE study. The toxicity must be reduced to allowable limits for that outfall within 2 years of initiation of the TIE/TRE study. Subsequent to the results obtained from the TIE/TRE studies, the permittee may request an extension of the TIE/TRE study period if necessary to conduct further analyses. The final determination of any extension period will be made at the discretion of the division.

The TIE/TRE study may be terminated at any time upon the completion and submission of 2 consecutive tests (for the same outfall) demonstrating compliance. Following the completion of TIE/TRE study, the frequency of monitoring will return to a regular schedule, as defined previously in this section as well in Part I of the permit. **During the course of the TIE/TRE study, the permittee will continue to conduct toxicity testing of the outfall being investigated at the frequency of once every three months but will not be required to perform follow-up tests for that outfall during the period of TIE/TRE study.**

Test procedures, quality assurance practices, determinations of effluent survival/reproduction and survival/growth values, and report formats will be made in accordance with Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013, or the most current edition.

Results of all tests, reference toxicant information, copies of raw data sheets, statistical analysis and chemical analyses shall be compiled in a report. The report will be written in accordance with Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013, or the most current edition.

Two copies of biomonitoring reports (including follow-up reports) shall be submitted to the division. One copy of the report shall be submitted along with the discharge monitoring report (DMR). The second copy shall be submitted to the local Division of Water Resources office address:

Chattanooga-Environmental Field Office  
Division of Water Resources  
1301 Riverfront Parkway Suite #206  
Chattanooga, TN 37402

**F. COMPLIANCE WITH CWA SECTION 316(A)**

***TDEC will extend the thermal variance in the renewed permit.***

Studies as outlined below shall be conducted by the permittee to confirm the performance of the SQN monitoring system and to verify that Section 316(a) of the Clean Water Act is being adequately met. The data from the studies shall be compiled with past data and reported to the Division of Water Resources with a request for continuation of the thermal variance in the next permit application.

1. Section 316(a)

- a. For Section 316(a), the permittee shall analyze previous and new data to determine whether significant changes have occurred in plant operation, reservoir operation or instream biology that would necessitate the need for changes in the thermal variance.
- b. Physical measurements to characterize and map the SQN thermal plume concurrent with biological field sampling, which is addressed below.
- c. TVA's Reservoir Fish Assemblage Index will be used to assess the overall health of the fish community in Chickamauga Reservoir. RFAI assessment includes reservoir benthic macroinvertebrate community monitoring, in addition to the fish community. Should the fish community, or particular populations fall significantly below expectations, further investigations will be proposed, and upon approval by the Division of Water Resources and EPA Region 4, initiated to verify apparent declines and assist in the identification of possible sources of impairment.

**G. COMPLIANCE WITH SECTION 316(B) FOR COOLING WATER INTAKE**

180 days prior to the permit's expiration date, the permittee must submit to the Director for review the information required under 40 CFR §122.21 paragraphs:

- r)(2). Source water physical data and r)(3) Cooling water intake structure data, and applicable provisions of the paragraphs below:
- r)(4) Source water baseline biological characterization data
- r)(5) Cooling water system data
- r)(6) Method of compliance with impingement mortality standards
- r)(7) Existing entrainment performance studies

(r)(8) Operational status

Additionally, because the facility actual intake flow is greater than 125 mgd the permittee must also submit:

(r)(9) Entrainment characterization study

(r)(10) Comprehensive technical feasibility and cost evaluation study

(r)(11) Benefits valuation study

(r)(12) Non-water quality and other environmental impacts study

(r)(13) Peer review of (r)(10), (r)(11), and (r)(12)

In accordance with 40 CFR §125.98(b)(6), the above ensures that the Director will have all the information necessary to establish Best Technology Available (BTA) requirements for impingement mortality and entrainment in the subsequent permit. In the interim, based on evaluation of available information on the facility cooling water intake structure used by the permittee, the Department has determined using Best Professional Judgment that the cooling water intake structure represents BTA to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326).

Given the shortened term of this permit (renewal application submittal is required approximately 3 years from the effective date), the permittee may be granted an extension by the Division upon request and as needed to complete the required 316(b) studies.

#### **H. STUDY TO CONFIRM CALIBRATION OF NUMERICAL MODEL**

The numerical model used to determine compliance with the temperature requirements for Outfall 101 shall be the subject of a calibration study once during the permit cycle. The study should be accomplished in time for data to be available for the next permit application for re-issuance of the permit. A report of the study will be presented to the Division of Water Resources. Any adjustments to the numerical model to improve its accuracy will not need separate approval from the Division of Water Resources; however, the Division will be notified when such adjustments are made.

The permittee shall calibrate the flow rate characteristics through the diffusers on a schedule of at least once every two years. For this permit period, such calibration shall be coordinated with the evaluation of the numerical modeling.

#### **I. INTAKE FOREBAY AERATION.**

TVA shall provide supplemental aeration, as necessary, in low-oxygen zones of the intake forebay area to serve as a fish refuge. Aeration may be temporarily discontinued during periods of maintenance. The permittee may request approval from the Division to permanently discontinue aeration upon demonstration that supplemental aeration is not necessary for fish survival in the intake forebay.

**PART IV - STORM WATER POLLUTION PREVENTION PLAN  
AND  
BIOCIDE/CORROSION TREATMENT PLAN**

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**A. STORM WATER POLLUTION PREVENTION PLAN**

Storm water runoff associated with industrial activity that is not discharged to the receiving stream through outfalls permitted in Part I of this permit is currently authorized under the Tennessee Storm Water Multi-Sector General permit for Industrial Activities (TMSP), Permit Number TNR050015. The TMSP requires development, implementation, and routine evaluation and updating of a storm water pollution prevention plan (SWPPP). The permittee shall also ensure that appropriate pollution prevention measures are identified in the SWPPP to minimize the discharge of pollutants in storm water or from ancillary activities via those outfalls described in Part I. Any necessary plan modifications shall be completed in accordance with the schedules set forth in the TMSP.

The discharger will develop, document and maintain a storm water pollution prevention plan (SWPPP) pursuant to the requirements as set forth in the Tennessee Multi-Sector General Permit for Industrial Activities, Sector O, "Storm Water Discharges Associated With Industrial Activity From Steam Electric Power Generating Facilities", Part 3, "Storm Water Pollution Prevention Plan Requirements", as found at: <http://www.state.tn.us/environment/wpc/stormh2o/pmt-o.pdf>. The plan shall be signed by either a principal executive officer of a corporation, the owner or proprietor of a sole proprietorship, or a partner or general partner of a partnership.

**B. BIOCIDE/CORROSION TREATMENT PLAN (B/CTP)**

The use of toxic chemicals at the site for process and non-process flows shall be managed under a Biocide/Corrosion Treatment Plan (B/CTP). The B/CTP shall describe chemical applications and macroinvertebrate controls and include all material feed rates with proposed monitoring schedules. The permittee shall conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals in accordance with conditions approved and specified in the B/CTP.

The permittee shall maintain the B/CTP at the facility and make the plan available to the Division upon request. The permittee shall amend the B/CTP whenever there is a change in the application of the chemical additives or change in the operation of the facility that "could significantly change the nature or increase the quantity of pollutants discharged." The Division shall also be notified in writing within 30 days of any material changes that will change the active ingredients or quantities used of any such chemical additives.

**C. DOCUMENTATION**

The permittee shall maintain the SWPPP and the B/CTP plans at the facility and shall make the plans available to the permit issuing authority upon request.

**D. SWPPP-B/CTP PLAN MODIFICATION**

The permittee shall amend the SWPPP or B/CTP plan(s) plan whenever there is a change in the facility or change in the operation of the facility that materially increases

the potential for the ancillary activities to result in a discharge of significant amounts of pollutants.

**E. MODIFICATION FOR INEFFECTIVENESS**

If the SWPPP or B/CTP plan(s) prove(s) to be ineffective in achieving the general objective of preventing the release of significant amounts of pollutants to surface waters and the specific objectives and requirements under section B, the permit shall be subject to modification pursuant to 40 CFR 122.62 or 122.63 to incorporate revised SWPPP or B/CTP requirements. Any such permit modification shall be subject to review in accordance with the procedures for permit appeals set forth in accordance with 69-3-110, Tennessee Code Annotated.

**F. COMPLIANCE SCHEDULE**

The SWPPP and B/CTP plan shall be maintained and the permittee shall begin implementation of any updates of the plan within six (6) months after the effective date of this permit.

<b>ADDENDUM TO RATIONALE – APRIL 2015</b>
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with  
Record of Comments and Responses  
Sequoyah Nuclear Plant – Tennessee Valley Authority  
NPDES Permit TN00026450

**I. Background and Introduction**

On May 8, 2013, TVA submitted an application for the renewal of an NPDES Permit for the discharge of industrial process and non-process wastewater. The TN Department of Environment and Conservation (TDEC), Division of Water Resources (the division) published a draft permit TN0026450 for the facility on March 9, 2015. Also, the division issued a public notice on the availability of the draft permit for public review and was followed by a comment period through April 13, 2015.

This Addendum to Rationale addresses comments submitted during the public notice period. It also presents TDEC's decision regarding the permit and rationale for that decision.

TVA and EPA Region 4 submitted minor administrative editing suggestions along with specific comments which are addressed below. TDEC's response and proposed permit changes, as applicable are also shown. Comments are shown in plain text with responses shown in **bold** text.

**II. Comments on Draft Permit and TDEC Responses**

**Comment 1:** Page 1 of 25: In Part I.A Table for Outfall 101 "Temperature, water deg. Centigrade", please change the sample type from Calculated to Recorder since it is a measured parameter, not computed.

**Response:** Effluent limits data set has been revised as requested.

**Comment 2:** Page 8 of 25, Part I.C Definitions:

TVA requests that "Continuous Monitoring" be defined as: *the measurement of temperature at a frequency that will accurately characterize the nature of discharges from the site and water in the receiving stream. Samples collected continuously shall be at a frequency of not less than once every fifteen minutes for temperature.*

**Response:** Definition has been revised as requested.

**Comment 3:** Page 8 of 25, Part I.C Definitions:

TVA requests that "Daily Maximum Temperature" be defined as: the largest of the ninety-six 15-minute (instantaneous) readings for the day.

**Response:** Definition has been revised as requested.

**Comment 4:** According to §125.98(b)(6), TDEC must establish interim BTA requirements. As a result, we suggest the following language be added to SQN's permit under Section G. of the permit after (r)(13):

*In accordance with §125.98(b)(6), the above ensures that the Director will have all the information necessary to establish Best Technology Available (BTA) requirements for impingement mortality and entrainment in the subsequent permit. In the interim, based*



*on evaluation of available information on the facility cooling water intake structure used by the permittee, the Department has determined using Best Professional Judgment that the cooling water intake structure represents BTA to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326*

**Response: Section G of Part III has been revised as requested.**

**Comment 5:**

TVA requested that the wording be clarified in the Rationale regarding "Helper Mode", to be defined as: *the treatment of at least part of the plant effluent by the cooling towers.*

*Based on previous discussions, TDEC emphasized that when the ambient > 29.4°C condition exists, the 1-hour average downstream temperature limit of 33.9°C becomes the next level of control for operating the plant. TVA believes the permit should not specify the exact operation conditions of the plant (i.e., number of lift pumps in operation for a specific situation).*

**Response: While the February 2015 Rationale discusses helper mode as meaning the operation of 3 pumps, the permit language does not prescribe the number of required lift pumps. Accordingly, the Rationale remains unchanged as the permit writers judgment at the time of publication, but a clarification is made in the permit (See page 3 of 25) to define the meaning of Helper Mode as desired.**

Section 316(a) of the Clean Water Act allows point-source discharges of heated water to exceed State water quality thermal criteria based on demonstrating maintenance of "Balanced Indigenous Populations" (BIP) of aquatic life. SQN is operating under a 316(a) alternate thermal variance that has been administratively continued with each permit renewal based on studies conducted in the 1980's.

**Comment 6:**

TVA requested that the wording be clarified in the Rationale regarding continuation of the thermal variance and requested that TDEC emphasize that this permit extends the thermal variance.

*In 2001, TDEC approved the TVA program for Reservoir Fish Assemblage Index (RFAI) studies to support the continuation of thermal variances. RFAI data are currently collected in Chickamauga Reservoir biannually upstream and downstream of SQN. With the application, TVA submitted data from 2000 through 2009 supporting its request for continuation of the 316(a) variance in from the previous permit (effective date March 2011).*

*As a condition of the previous permit (in order to further support continuation of the thermal variance), TVA was required to conduct an updated, comprehensive study of the effects of the thermal discharge on the fish and wildlife community of Chickamauga Reservoir. This specialized "316(a) Demonstration Study" was conducted following a Study Plan developed under the direction of EPA Region 4 and the Division of Water Resources and demonstrated that a balanced indigenous population was being*

supported<sup>3</sup>. The Division finds that the TVA study results are acceptable and EPA Region 4 concurred with this finding<sup>4</sup>.

*There have been no significant changes to SQN design and/or operations since the previous specialized study (2011) that would bring about material changes in the established characteristics of the thermal discharge and no changes are reasonably foreseen for the term of the this permit. As such, the Division of Water Resources concludes that the results of the previous 316(a) Demonstration Study remain valid and representative of SQN thermal discharge effects on the receiving waterbody and continues to justify a thermal variance under Section 316(a) of the Clean Water Act. Thus, TDEC will extend the thermal variance in the renewed permit.*

*TVA's Reservoir Fish Assemblage Index will be used to assess the overall health of the fish community in Chickamauga Reservoir during this permit term. If the fish community or particular populations fall significantly below expectations, further investigations will be proposed, and upon approval by the Division of Water Resources, initiated to verify apparent declines and assist in the identification of possible sources of impairment.*

**Response:** We have revised Part III. F, **Compliance with CWA Section 316(a)** to stress the extension of the thermal variance in this permit and to require TVA to continue biological monitoring using the RFAI methodology. The RFAI methodology is essentially equivalent to the TDEC- and EPA-approved study plan.

To further clarify 316(a) provisions, language regarding river system operation during extreme low flows has been deleted from versions used in the draft and in previous permits. This language is found in the previous permit under Part III.F.1 (b) and (c). TVA advises they have never needed to operate the river system at these low flow conditions, and except during extreme drought conditions, TVA believes there would be no risk of needing to operate the river system at such low flows in the future.

Should an event require reducing the river flow below these levels due to unusual circumstances, TDEC will require TVA to conduct field surveys at the earliest opportunity, in consideration of safe boating conditions and the time required to mobilize staff and equipment.

**Comment 7:**

The fact sheet should address RPA using background numbers for metals. At least explain that metals may not be a problem because of no coal ash discharges.

**Response:**

As shown on page V-3 of the application, significant levels of metals are not present in the primary discharge, Outfall 101, in concentrations at or above the TN WQC. The

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<sup>3</sup> TVA, *Biological Monitoring of the Tennessee River Near Sequoyah Nuclear Plant Discharge, Summer and Autumn 2011*, May 2012.

<sup>4</sup> EPAR4 email, Roland Ferry, PhD., to KJ Shell, *Subject: TN0026450 – Comments on Draft NPDES Permit*, April 22, 2015

**most significant concern for Reasonable Potential deals with chronic toxicity, due to the use of biocides. TVA provided a Reasonable Potential Analysis with the application which states:**

*Previous to the issuance of the current permit, Outfall 101 demonstrated No Reasonable Potential for excursions above the ambient water quality chronic (CCC) criterion using historical effluent data. This demonstration of No Reasonable Potential has been maintained throughout the current permit cycle as evidenced in the accompanying historical effluent data for the last 20 studies.*

**And**

***Reasonable Potential Determination:***

The last 20 studies for Outfall 101 were used for determining Reasonable Potential, with all studies resulting in no observed toxicity (<1.0 TUc) and a coefficient of variation equal to zero. This outcome demonstrates that no Reasonable Potential for excursions above the CCC exists, based on data obtained from testing conducted under the current operating conditions.

Historical data for the last 20 studies follows, and is followed thereafter with documentation of chemical additions which occurred during sampling for toxicity tests for Outfall 101.

**The application and related permit documents are available online at the TDEC Water Permits Data Viewer, <http://www.tn.gov/environment/dataviewers.shtml>.**

**Comment 8:**

There are several limits that need, for enforcement purposes, either a zero before the decimal point, or a decimal point and zero after the limit. For instance, the TRC limit should be "0.1" instead of ".1". Permittees can also round a number like "3.4" to comply with "3".

**Response: The effluent limits data sets of the Permit have been revised to reflect this comment.**

**Comment 9:**

Please clarify why the permit has a thermal MZ and also a 316a variance. Regarding the 316a variance, verify that the [biological] study results were presented the way EPA recommended, that it determines that the BIP [is protected], determine[s] the types of fish present in the vicinity of the discharge compared to a reference location, and determine[s] the presence of heat tolerant species, etc.

**Response:**

**The mixing zone identifies where the Alternate Thermal Limit (ATL) is measured; the ATL is the value not to be exceeded. This approach may be unique, but has been continued for several permit cycles. It provides a definitive picture of the thermal discharge in the river inclusive of changing river flow and ambient river temperatures, and better matches the fact that the criterion to be met is an instream water column criterion, not a modeled surrogate.**

During the previous permit cycle, TVA developed a Study Plan<sup>5</sup> to evaluate the ATL, which was approved by EPA Region 4. TVA reported that summer and autumn biological monitoring demonstrated that a Balanced Indigenous Population was maintained<sup>6</sup>. EPAR4 reviewed the report and concurred<sup>7</sup>.

Given the expiration of this permit in 2018 (Tennessee River watershed year), Part III. F. of the Permit, "Compliance with Section 316(a)" reflects a continuing requirement during this permit cycle for biological monitoring sufficient to justify continuation of the ATL during the next permit cycle.

**Comment 10:**

Please clarify how metal cleaning wastes are being handled – is there an ongoing discharge?.

**Response:** TVA noted in the application, page 2 under Outfall 107, that piping to the Metal Cleaning Waste Treatment Ponds has been disconnected and that the ponds will be closed in the future.

The revised permit wording enables TVA to discharge rain water through the inactive ponds pending closure. Any flow will be directed through the Yard Drainage Pond into the Condenser Cooling Water Discharge Channel. At the time of closure, the ponds will be dewatered, during which additional monitoring of the constituents is required – see page 5 of the permit.

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<sup>5</sup> TVA, *Study Plan for Evaluation of the TVA Sequoyah Nuclear Plant Discharge in Support of an Alternate Thermal Limit*, June 8, 2011, Revised August 3, 2012.

<sup>6</sup> TVA, *Biological Monitoring of the Tennessee River Near Sequoyah Nuclear Plant Discharge, Summer and Autumn 2011*, TVA Biological and Water Resources, May 2012.

<sup>7</sup> EPAR4 email, Roland Ferry, PhD., to KJ Shell, *Subject: TN0026450 – Comments on Draft NPDES Permit*, April 22, 2015.

**RATIONALE – FEBRUARY 2015**

**TVA - Sequoyah Nuclear Plant  
NPDES PERMIT NO. TN0026450  
Soddy Daisy, Hamilton County, Tennessee**

Permit Writer: Mr. Bob Alexander<sup>8</sup>

**I. DISCHARGER**

<p><b>TVA - Sequoyah Nuclear Plant SB-2A, Sequoyah Access Road, P O BOX 2000 Soddy Daisy, Hamilton County, Tennessee</b></p> <p><b>Contact Person:</b> <b>Stephanie Howard, Environmental Manager - SQN and WBN 423-843-6700</b></p> <p><b>Nature of Business:</b> <b>Production of electric power by thermonuclear fission and other associated operations.</b></p> <p><b>SIC Code(s): 4911 (Electric Services)</b> <b>Industrial Classification: Primary [PRIMARY INDUSTRY CATEGORY means any industry category listed in the NRDC Settlement Agreement (Natural Resources Defense Council v. Train, 8 ERC 2120 [D.D.C. 1976], modified 12 ERC 1833 [D.D.C. 1979]).]</b> <b>Discharger Rating: Major</b></p>
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**II. PERMIT STATUS**

<p><b>NPDES Permit No. TN0026450 issued 1/31/11 NPDES Permit No. TN0026450 expired 10/31/13 Application for Renewal received at: 5/8/13</b></p>
<p><b><u>Watershed Scheduling</u></b></p> <p><b>Environmental Field Office: Chattanooga</b> <b>Primary Longitude: 85-05-14      Primary Latitude: 35-12-35</b> <b>Hydrocode: 6020001 Watershed Group: 3</b> <b>Watershed Identification: Tennessee River (Hamilton Co. Except Chattanooga)</b></p> <p><b>Target Watershed Evaluation Date: 2018</b></p>

<sup>8</sup> Contact 615-532-0659; Robert.alexander@tn.gov

### III. FACILITY DISCHARGES AND RECEIVING WATERS

TVA - Sequoyah Nuclear Plant discharges process and non-process wastewaters through Outfalls 101, IMP103, IMP107, 110, 116, 117 and 118 to Tennessee River. Appendix 1 summarizes facility discharges and receiving stream information for all outfalls.

The Tennessee Multi-Sector General Storm Water Permit TNR050015 covers storm water discharges associated with industrial activity of this facility. Storm water concerns associated with this facility are covered in this general permit, so they will not be addressed in detail in the individual NPDES permit.

The Chickamauga Reservoir portion of the Tennessee River is considered to be fully supporting all designated uses shown in Appendix 1. Biological data submitted by TVA with the permit application addresses the condition of the fishery in Chickamauga Lake. These data are discussed below as part of the analyses of thermal effects of cooling water discharges.

Flow is regulated in the Tennessee River by upstream operations of Watts Bar Dam at mile 529.9 and, therefore, the TDEC rule at 0400-40-03.05 require application of the minimum critical low flow based on the 1Q10 recurrence interval. The 1Q10 used in the previous permit was 5400 cfs or 3491 MGD.

#### Note on Radiological Discharges:

Effluent discharges authorized through an NPDES program can not cause condition of pollution, nor a discharge of toxics in toxic amounts can be authorized. Any substance, including radioactive materials, is of interest to our agency if it has reasonable potential to exceed applicable water quality criteria. However, radioactive releases to the environment, notwithstanding point source discharges authorized via this permit, are not regulated under the Clean Water Act, but are instead regulated under the Nuclear Regulatory Commission (NRC) by issuance of an Operating License. Pertinent regulations are found under 10 CFR Part 20 and 10 CFR Part 50. Sequoyah Nuclear Plant effluents that may contain radioactive material are not addressed as part of the NPDES permitting process.

### IV. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

The Standard Industrial Classification (SIC) code for TVA - Sequoyah Nuclear Plant is 4911 (Electric Services). Process wastewater discharged through Outfall 101 is regulated by 40 CFR Part §423.12(b) (3)-BPT, and 40 CFR Part §423.13(d) (1)-BAT. Appendix 2 lists the applicable best available technology (BAT) and best conventional pollution control technology (BCT) effluent limitations guidelines. Certain variances are included in the permit to comply with Section 316(a) of the Clean Water Act.

EPA has drafted revised ELGs for steam electric plants with final ELGs are planned to be published in 2015. At that time, the need for reopening the permit can be revisited per Part III of the permit.

### V. PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

Appendix 3 lists the permit limitations and monitoring requirements as defined in the previous permit.

Previous permit terms related to compliance with CWA Section 316 included submission of biological monitoring data conducted in 2012. These data are discussed below relevant to thermal conditions and permit limits.

## **VI. HISTORICAL MONITORING AND INSPECTION**

During the previous permit term there were no reported violations of the applicable effluent limitations. Data reported by TVA - Sequoyah Nuclear Plant on Discharge Monitoring Report forms during the previous permit term is summarized in Appendix 4.

Division field personnel performed a recent (2013) Compliance Evaluation Inspection (CEI) at the facility however, no notable issues were revealed.

## **VII. NEW PERMIT LIMITS AND MONITORING REQUIREMENTS**

The proposed new permit limits have been selected by determining technology-based limits, then evaluating whether those limits protect the water quality of the receiving stream. If the technology-based limit would cause violations of water quality, then the water quality-based limit is chosen. The technology-based limit is determined from EPA effluent limitations guidelines if applicable (see Part IV); or from State of Tennessee effluent limits for effluent limited segments per Rule 0400-40-05-.03(2); or by way of operational and/or treatability data.

Note that in general, the term “anti-backsliding” refers to a statutory provision that prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains effluents limits, permit conditions, or standards that are less stringent than those established in the previous permit.

Appendix 5 lists the proposed effluent limitations and monitoring requirements for all outfalls to be included in the new permit.

### **A. Outfall 101**

Outfall 101 is the largest volume discharge from the TVA-SQN facility that is primarily composed of once through cooling waters. It also contains water from internal monitoring points (IMP) 103 and 107, and storm water runoff from the site. When the plant is operating in open mode, the discharge volume will be more than a billion gallons per day. Discharge is by gravity feed to the two diffusers from the diffuser pond. The diffuser pond does not have a significant holding capacity for the discharges and the residence time for water in the pond is relatively short (several hours).

#### **a. Flow**

Flow shall be reported in Million Gallons per Day (MGD). Monitoring of flow quantifies the load of pollutants to the stream. The flow shall be continuously monitored and recorded, and reported on the monthly discharge report (DMR).

#### **b. Oil and Grease**

The limits for Oil and Grease per 40 CFR 423 (15 mg/l Monthly Average and 20 mg/l Daily Maximum) are applied here to meet the monitoring and compliance standards for low volume wastes. A review of data for Oil and Grease at Outfall101 for the past 14 years shows a maximum of 10.0 mg/L and a median value of < 5.0 mg/L. TVA also monitors Oil and Grease from the Low Volume Waste Pond (IMP103). To comply with antibacksliding provisions, IMP103 will become the primary monitoring and compliance point for Oil & Grease. Oil and Grease monitoring at Outfall101 will be deleted from the permit requirements.

**c. Total Suspended Solids (TSS)**

The limits for Total Suspended Solids (TSS) per 40 CFR 423 (30 mg/l Monthly Average and 100 mg/l Daily Maximum) are applied here to meet the monitoring and compliance standards for low volume wastes. A review of data for TSS at Outfall101 for the past 14 years shows a maximum of 38.0 mg/L and a median value of 5.0 mg/L. TVA also monitors TSS from the Low Volume Waste Pond (IMP103). To comply with antibacksliding provisions, IMP103 will become the primary monitoring and compliance point for TSS. TSS monitoring at Outfall101 will be deleted from the permit requirements.

**d. pH**

According to the State of Tennessee Water Quality Standards [Chapter 0400-40-03-.03(3) (b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours. A review of data for pH at Outfall101 for the past 14 years shows a maximum of 8.5 S.U. and a median value of 7.6 S.U. TVA also monitors pH from the Low Volume Waste Pond (IMP103). To comply with antibacksliding provisions, IMP103 will become the primary monitoring and compliance point for pH. pH monitoring at Outfall101 will be deleted from the permit requirements. The previous permit limits of 6.0 to 9.0 are retained at IMP103 and were taken from EPA's Effluent Limitation Guidelines 40 CFR Part 423.

**e. Polychlorinated Biphenyls**

EPA's Effluent Limitation Guidelines in 40 CFR Part 423 requires that there shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid. Therefore, **NO DISCHARGE of PCBs will be allowed**. A review of data for PCB at Outfall101 for the past 11 years shows values below 0.0005 mg/L, which is the Required Detection Level per TDEC rules. PCB monitoring at Outfall101 will be revised to require reporting once per permit cycle by grab sample.

**f. Total Residual Chlorine**

Technology-based (BAT) limits of 0.2 mg/L monthly average and 0.5 mg/L daily maximum limits apply to free available chlorine in cooling tower blowdown in accordance with 40 CFR, part 423, Subpart 423.13 (b) (1). The total residual chlorine (TRC) test includes all chlorine species measured in the free available chlorine test as well as other chlorine compounds such as chloramines. Thus the permit writer retains the TRC test in place of the free available chlorine test for compliance with the 40 CFR limitations.

Water quality limits of 0.04 mg/L monthly average and 0.06 mg/L daily maximum for total chlorine residual are calculated to protect water quality as shown in Appendix 5a based on the discharge flow of Outfall 101, 1509.6 MGD. The limits are based on the protection of water quality in the Tennessee River to meet published WQC of 0.011 monthly average and 0.019 mg/l daily maximum.



A review of data for TRC values at Outfall101 during the previous permit shows an average concentration of 0.018 mg/L and a maximum of 0.056 mg/L. Accordingly, the renewed permit will establish the monthly average limit of 0.04 mg/L and the daily maximum limit of 0.06 mg/L for Total Residual Chlorine (TRC).

With the permit application, TVA submitted:

*The Lower Limit of Quantification (LLD) for the colorimetric analysis of chlorine using DPD indicator are extremely variable and dependent upon the sample matrix. Typically, a more pure matrix results in a lower LLD because less interference is present. Instrument manufactures typically report a "best case" LLD in their specification by using a distilled water matrix for LLD determination. However, this LLD cannot be achieved in more complex matrices such as river water due to the presence of organic compounds and color which both negatively impact analytical sensitivity.*

*Sequoyah has performed extensive LLD studies for chlorine analysis using EPA-approved analytical methodologies and associated instrumentation. Sequoyah has determined that the LLD for Tennessee is 0.08 mg/L. This study was independently confirmed by Watts Bar Nuclear Plant.*

The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136, as amended. The method detection level (MDL) for TRC shall not exceed 0.08 mg/l, unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. Under the renewed permit limits, reporting of TRC at less than 0.08 mg/l shall be interpreted to constitute compliance with the permit.

**g. Compliance with Section 316, Clean Water Act**

**1. 316(a) Potential Thermal Effects on a Balanced Indigenous Population**

Thermal discharges are a concern for potential effects on a balanced and indigenous population of fish and other aquatic organisms at this location. TVA's extensive studies to date will be further expanded under EPA's guidance during this permit cycle. EPA Region IV has indicated that additional aquatic data should be collected during the five-year duration of the subject permit to facilitate the Section 316(a) determination in the "next NPDES permit." (Permit III.L.) The renewed permit retains the alternative thermal limit as existing data demonstrate the maintenance of a balanced indigenous population ("BIP") in the receiving water body. TVA will be required to submit a study plan outlining proposed assessments to support continuance of the ATL. The plan will be designed to supplement existing information previously provided by TVA. EPA has agreed to this approach and will participate in the review of the plan and the resulting data.

Section 316(a) of the Clean Water Act allows point-source discharges of heated water to exceed State water quality thermal criteria based on demonstrating maintenance of "Balanced Indigenous Populations" (BIP) of aquatic life. SQN is operating under a 316(a) alternate thermal variance that has been administratively continued with each permit renewal based on studies conducted in the 1980's. The requirement for conducting 316(a) studies in TN comes from EPA Region IV guidance to the States requiring future variance requests be granted on new data generated to show aquatic communities meet the BIP standard.

In 2001, TDEC approved the TVA program for Reservoir Fish Assemblies Index (RFAI) studies to support the continuation of thermal variances. RFAI data is collected at upstream and downstream stations in Chickamauga Lake every year. With the application, TVA submitted data from 2000 through 2009 supporting their request for continuation of the 316(a) variance from the previous permit.

With the permit renewal application of May 2013, TVA described ecological conditions near SQN as monitored at three locations under their Vital Signs (VS) program, inflow, transition and forebay. In addition to the fish community, environmental indicators are measured in the VS program for dissolved oxygen, chlorophyll, sediment quality, and benthic macro-invertebrate community.

TDEC has reviewed the most recent RFAI fish community data and identified no substantial difference in the fish community of the Chickamauga Reservoir between fish upstream and downstream of SQN. Fish data for both the upstream and downstream stations were determined similar and meet the BIP standard.<sup>9</sup>

As required by the current permit, TVA has conducted studies to demonstrate BIP per the revised reservoir monitoring approach deemed acceptable to TDEC and EPA Region 4. **In the renewed permit, TDEC will extend the thermal variance, based on these findings.**

## **2. Thermal Limits and Monitoring Requirements**

This permit requires compliance with TN effluent temperature criteria except for the months of November through March when a variance is allowed for upstream to downstream rise in temperature to be as great as 5 C°. Otherwise, temperature shall be limited according to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 0400-40-03-.03(3) (e)]. It is recognized that the temperature of the cooling water discharge will be greater than the temperature of the water prior to its use for cooling or other purposes. This discharge shall not cause the temperature change in receiving stream to exceed 3°C relative to an upstream control point for the months of April through October. Also, this discharge shall not cause the temperature of receiving stream to exceed 30.5°C (except as a result of natural causes), and this discharge shall not cause the maximum rate of temperature change in receiving stream to exceed 2°C per hour; except as a result of natural causes.

The calculated and measured temperatures of the effluent are reported on the monthly Discharge Monitoring Reports (DMRs). The temperature difference, rate of change, and receiving stream calculated-temperatures, shall also be limited and reported on the DMR's. The measured, reported, temperature of the effluent is not limited as such, and an exceedances of the above mentioned 30.5°C water quality criteria will not be considered a permit violation for measured effluent temperature. **The 30.5°C value applies to the receiving stream, not the effluent.** When background stream temperatures are warm and approach 30.5°C as a result of natural conditions the division understands that the plant is then operated in Helper Mode. Helper Mode is defined as: full operation of one cooling tower and at least three lift pumps per operating unit. The permit maximum of 30.5°C may be exceeded

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<sup>9</sup> TVA, *Biological Monitoring of the Tennessee River Near Sequoyah Nuclear Plant Discharge, Summer and Autumn 2011*, May 2012.

when the instream temperatures exceed 29.4°C and the plant operates in Helper Mode. In no circumstance shall a one-hour average maximum downstream river temperature exceed 33.9°C without consent of the permitting authority. **The division shall be notified by phone, facsimile, and/or electronic mail as soon as possible (within 12-hours of calculating these conditions) should these conditions present themselves.** Compliance with the 30.5°C maximum limit shall be determined from the 24-hour average.

The 24-hour average temperature rise in the receiving stream shall be calculated by taking measurements continuously (continuously is defined as measurements taken in 15 minute or less intervals). The 24-hour average value shall be determined using the current and previous ninety-six 15-minute measurements. Thus, every 15 minutes a 24-hour average value shall be calculated. The maximum of the ninety-six observations generated per day by this procedure shall be the daily maximum temperature rise for that day.

Instream river temperatures shall be averaged every 15 minutes in similar fashion to give a "rolling" 24-hour average. To determine compliance with the instream maximum limit of 30.5°C and the temperature difference between upstream and downstream temperatures, the 24-hour average shall be used.

Tennessee Rule 0400-40-03-.05 applies to temperature monitoring by including protection of the water quality in the mixing zone.

"Mixing Zone - Mixing zone refers to that section of a flowing stream or impounded waters in the immediate vicinity of an outfall where an effluent becomes dispersed and mixed. Such zones shall be restricted in area and length and shall not (i) prevent the free passage of fish or cause aquatic life mortality in the receiving waters; (ii) contain materials in concentrations that exceed recognized acute toxicity levels for biota representative of the aquatic community in the receiving waters; (iii) result in offensive conditions; (iv) produce undesirable aquatic life or result in dominance of a nuisance species; (v) endanger the public health or welfare; or (vi) adversely affect the reasonable and necessary uses of the area; (vii) create a condition of chronic toxicity beyond the edge of the mixing zone; and (viii) adversely affect nursery and spawning areas."

The mixing zone was established in the initial EPA-issued permit (April 1, 1983), and as defined, has been retained in Tennessee's reissuance of the permit. The definition of the mixing zone for the new permit is continued from the previous permit for the discharge at Outfall 101, which encompasses 1500 feet downstream of the diffusers to 275 feet upstream of the diffusers and 750 feet wide. Depth of the mixing zone includes the entire depth of the reservoir on the downstream side of the diffusers. On the upstream side of the diffusers the mixing zone extends in depth from the surface 275 feet upstream of the diffusers to the top of the diffuser pipes. The initial mixing zone also included the intake forebay and diffuser pond when the plant operated in closed mode. The diffuser pond is not recognized as waters of the State, instead is considered part of the treatment system and therefore, is not part of the mixing zone for permit purposes. The intake forebay is recognized as waters of the State, but shall be included in the mixing zone only in circumstances when the plant operates in closed mode. The intake forebay connects to the river through openings at the bottom of the skimmer wall. In closed mode operation relatively little water is coming through the openings in the skimmer wall. Therefore, it makes sense to include the intake forebay in the mixing zone in these circumstances. TVA does not anticipate the operation of the plant in closed mode. However, if such emerges as a serious possibility, the monitoring requirements for the forebay shall be determined by appropriate study at that time.

The mixing zone is needed for two reasons. It allows mixing for the thermal loading of the effluent before water quality criteria must be met. For compliance purposes, it allows a well-defined area to be used for actual instream assessments.

When both units are operational, the difference between the upstream and downstream temperatures is usually between 3 and 4 Celsius degrees during the winter months. The maximum for data reported since January 2000 was 2.0°C. Since 2000, an instream-maximum temperature greater than 30.5°C has only occurred only during the summer of 2010. In these events, no temperature violations were incurred because the plant was placed in helper mode with the operation of one cooling tower and three lift pumps per operating unit. Under these operating conditions, the maximum instream temperature may exceed 30.5°C. During the drought of 2006-7, the highest reported receiving-stream temperature was less than 30.5° in summer.

Sampling of the effluent flow and temperature shall be continuous and shall be recorded for the DMR.

### **3. Cooling Water Intake Structure - Section 316(b)**

#### **a. Background**

The section 316(b) Existing Facility Final Rule, effective October 14, 2014, applies to facilities that use cooling water intake structures to withdraw water from waters of Tennessee and have or require a National Pollutant Discharge Elimination System (NPDES) permit issued under the TN Water Quality Control Act and Section 402 of CWA. If a facility meets the conditions specified below (from 40 CFR 125.91), it is subject to the rule.

The rule applies to owners and operators of existing facilities that meet all of the following criteria:

- The facility is a point source;
- The facility uses or proposes to use one or more cooling water intake structures with a cumulative design intake flow (DIF) of greater than 2 mgd to withdraw water from waters of Tennessee; and,
- 25% or more of the water the facility withdraws on an actual intake flow basis is used exclusively for cooling purposes.

The Compliance Date for these rules is July 14, 2018.

If a facility has or requires an NPDES permit but does not meet the 2 million gallons per day (mgd) intake flow threshold, it is subject to permit conditions implementing CWA section 316(b) developed by the Division of Water Resources (Director) on a case-by-case basis using Best Professional Judgment (BPJ).

Generally, facilities that meet these criteria fall into two major groups: steam electric generating facilities and manufacturing facilities. The rule also makes limited corrections to the requirements for "Phase I" facilities (i.e., new facilities). The rule establishes national requirements applicable to the location, design, construction, and capacity of cooling water intake structures at existing facilities that reflect the best technology available for minimizing the adverse environmental impact - impingement and entrainment – associated with the use of these structures. The rule requires several types of information collection as part of the NPDES permit application. In general, the information would be used to identify if the facility is meeting the rule or how the facility plans to meet the rule requirements.

**b. Specific data requirements with permit applications**

Specific data requirements that apply to all facilities are:

1. **Source water physical data** which shows the physical configuration of all source waterbodies used by the facility, identifies and characterizes the source waterbody's hydrological and geomorphological features, and provides location through maps §122.21(r)(2).
2. **Cooling water intake structure data** which shows the configuration and location of cooling water intake structures, provides details on the design and operation of each cooling water intake structure, and diagrams showing flow distribution and water balance § 122.21(r)(3)1.
3. **Source water baseline biological characterization data** that characterizes the biological community in the vicinity of the cooling water intake structure (CWIS) and characterizes the operation of the CWIS § 122.21(r)(4)1.
4. **Cooling water system data** that, among other things, describes the operation of the cooling water system, its relationship to the CWIS, the proportion of the design intake flow used in the system, the number of days the cooling water system is operational and seasonal changes in operation, as well as design and engineering calculations to support these descriptions § 122.21(r)(5).
5. **Impingement mortality standards compliance** information that describes the facility's selected methods; the specific requirements vary, depending on the compliance approach chosen by the facility. This information would be reflected in the facility's Impingement Technology Performance Optimization Study § 122.21 (r)(6).
6. **Entrainment performance studies** provides a description of any existing of biological survival conducted at the facility and a summary of any conclusions or results §122.21(r)(7).
7. **Operational status** data that describes the operational status of each generating, production, or process unit §122.21(r)(8).

In addition to the above requirements, **existing facilities with actual intake flows in excess of 125 mgd** are required as part of the permit application process to submit an **entrainment characterization study** and related supporting information § 122.21 (r)(9)-(12) that has been peer reviewed § 122.21 (r)(13), as shown below. Facilities that withdraw less than 125 mgd actual intake flow do not have specific permit application requirements for entrainment, but the Director may require additional information on a site-specific basis.

8. **Entrainment data collection plan per entrainment characterization study** §122.21(r)(9).
9. **Evaluate feasibility of all technologies, engineering/social cost estimates to complete a comprehensive technical feasibility and cost evaluation study** §122.21(r)(10).
10. **Monetized losses from impingement and entrainment, other benefit categories for developing a benefits valuation study** §122.21(r)(11).
11. **Energy penalty, thermal, air emissions, safety, reliability, etc. for developing a non-water quality and other environmental impacts study** §122.21(r)(12).
12. **External peer review of feasibility, costs, benefits, and environmental impacts studies; must notify Director of reviewers; and, Director may disapprove and/or require additional reviewers for completing the peer review per §122.21(r)(10), (r)(11), (r)(12).**

Under the 2014 rule, a new unit at an existing facility that withdraws more than 2 MGD would have requirements similar to the requirements of a new facility in Phase I. A new unit (as defined at § 125.92(u)) is required to reduce flow commensurate with closed-cycle cooling. Alternatively, a facility could demonstrate compliance with the entrainment control requirements by establishing reductions in entrainment mortality for the new unit that are 90 percent or greater of the reductions that would be achieved by closed-cycle cooling.

Finally, facilities are required to maintain records of all submitted documents, supporting materials, and monitoring results for at least five years. Depending on the compliance method chosen, facilities may also be required to perform compliance monitoring to demonstrate that their selected method of complying with the impingement mortality standard (e.g. screen velocity, actual intake flow, numeric impingement mortality performance) achieves the required performance.

#### **c. Timing of Rule Applicability**

Since TVA applied in May 2013 for the expired permit (i.e., well before the rule was published in October 14, 2014), reissuance must include conditions to ensure the above specific data requirements are developed during this permit term. Data to support the permittee's approach to compliance will be submitted with the next permit renewal application in 2020..

#### **d. Applicability to TN0026450**

Significant factors in evaluating applicability of these rules to this facility include:

- TVA has provided information indicating that SQN meets the applicable criteria in para. a. above.
- TVA submitted a timely renewal application prior to the expiration date and the renewal process was underway at the time of the final rule's effectiveness.
- The NPDES permit application indicates a discharge of approximately 1,491 MGD of non-contact cooling water (plus stormwater and other minor wastewater quantities) through Outfall 101.

#### **e. New permit conditions**

Part III of the new permit will include the following conditions:

Prior to the new permit's expiration date, the permittee must submit to the Director for review the information required under 40 CFR 122.21:

- (r)(2) Source water physical data and (r)(3) Cooling water intake structure data, and any applicable paragraphs below:
- (r)(4) Source water baseline biological characterization data
- (r)(5) Cooling water system data
- (r)(6) Method of compliance with impingement mortality standards
- (r)(7) Existing entrainment performance studies
- (r)(8) Operational status
- (r)(9) Entrainment characterization study
- (r)(10) Comprehensive technical feasibility and cost evaluation study.
- (r)(11) Benefits valuation study.

- (r)(12) Non-water quality and other environmental impacts study.
- (r)(13) Peer review
- 

### **SUMMARY OF PROPOSED PERMIT LIMITS - -OUTFALL 101**

**Feature Description : External Outfall, Number : 101**

**Monitoring : Effluent Gross, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Chlorine, total residual	<=	.1	mg/L	Calculated	5/week	Daily Maximum
Chlorine, total residual	<=	.1	mg/L	Calculated	5/week	Monthly Average
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Recorder	Continuous	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Calculated	Daily	Monthly Average
Temperature, water deg. centigrade	Report	-	deg C	Calculated	Continuous	Daily Maximum
IC25 Static Renewal 7 Day Chronic Chrceriodaphnia	>=	42.8	%	Composite	Monthly	Minimum
IC25 Static Renewal 7 Day Chronic Chrpimephales	>=	42.8	%	Composite	Monthly	Minimum

**Monitoring : Effluent Gross, Season : Winter**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temp. Diff. between samp. & upstrm deg. C	<=	5	deg C	Calculated	Continuous	Daily Maximum

**Monitoring : Instream Monitoring, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temperature rate of change deg. C/hr	<=	2	deg C/hr	Calculated	Continuous	Daily Maximum
Temperature, water deg. centigrade	<=	30.5	deg C	Calculated	Continuous	Daily Maximum

**Monitoring : Instream Monitoring, Season : Summer**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temp. Diff. between samp. & upstrm deg. C	<=	3	deg C	Calculated	Continuous	Daily Maximum

### **B. Internal Monitoring Point 103**

IMP103 is an internal sampling point for various flows treated in the Low Volume Waste Treatment Pond (LVWTP), which includes pressure washing and vehicle washing. Wastewater from the Essential Raw Cooling Water (ERCW) system, the Raw Cooling Water (RCW) system, the Lined Metal Cleaning Waste Pond, and the Turbine Building Sump also discharge into the LVWTP. The diffuser pond discharges pass through the diffusers through Outfall 101, into the Tennessee River. **IMP103 will remain the primary monitoring and compliance point for low volume waste, enabling verification of compliance with ELGs shown in Appendix 2 prior to dilution in the Diffuser Pond.**

- (b) The term *low volume waste sources* means, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this part. Low volume wastes sources include, but are not limited to: wastewaters from wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems.

### Flow

Flow shall be reported in Million Gallons per Day (MGD) and monitored at the time of sample collection. Flow will be recorded based on an instantaneous flow meter reading and reported once per week.

### Oil and Grease

The limits for oil and grease in the new permit will be required by EPA's Effluent Limitation Guidelines (ELG) 40 CFR Part 423: 15 mg/l Monthly Average, 20 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the low volume waste sources shall not exceed the quantity determined by multiplying the flow of the low volume waste sources times the concentration listed in the [following] table." However to comply with antibacksliding provisions the previous permit limits will be retained. Sampling will be once per month by grab sample.

### Total Suspended Solids (TSS)

The limits for TSS in the new permit will be required by EPA's Effluent Limitation Guidelines (ELG) 40 CFR Part 423: 30 mg/l Monthly Average, 100 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the low volume waste sources shall not exceed the quantity determined by multiplying the flow of the low volume waste sources times the concentration listed in the [following] table." However to comply with antibacksliding provisions the previous permit limits will be retained. Sampling will be once per month by grab sample.

### pH

According to the State of Tennessee Water Quality Standards [Chapter 0400-40-03-.03(3) (b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours. The previous permit limits of 6.0 to 9.0 will be retained and were derived from EPA's Effluent Limitation Guidelines 40 CFR Part 423. The sample type will be grab and will be measured three times per week.

## SUMMARY OF PROPOSED PERMIT LIMITS – IMP 103

**Description : Internal Outfall, Number : 103, Monitoring : Effluent Gross, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Instantaneous	Weekly	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Instantaneous	Weekly	Monthly Average
Oil & Grease	<=	<b>20</b>	mg/L	Grab	Monthly	Daily Maximum
Oil & Grease	<=	<b>15</b>	mg/L	Grab	Monthly	Monthly Average
Solids, total suspended	<=	<b>100</b>	mg/L	Grab	Monthly	Daily Maximum
Solids, total suspended	<=	<b>30</b>	mg/L	Grab	Monthly	Monthly Average
pH	<=	<b>9</b>	SU	Grab	Weekly	Maximum
pH	>=	<b>6</b>	SU	Grab	Weekly	Minimum



### **C. Internal Monitoring Point 107**

IMP07 is an internal monitoring point previously used to check compliance with permit limitations for the metal cleaning wastewaters (which are no longer discharged) routed through 3 small ponds. The existing permit allows discharge of stormwater through these ponds without monitoring. Revised wording is shown below to address the flow of stormwater pending dewatering and closure of the ponds,

The renewed permit approves routing the stormwater via the Yard Drainage Pond and Condenser Cooling Water Discharge Channel which ultimately discharges into the Diffuser Pond then through Outfall 101 to the Tennessee River, and is monitored by parameters established for those discharged wastewaters.

#### Revised Permit Wording

*TVA Sequoyah Nuclear Plant is authorized to discharge rain water from the Metal Cleaning Waste Treatment Ponds to the Low Volume Waste Treatment Pond, (IMP103), the Yard Drainage Pond, or the Condenser Cooling Water Channel, which ultimately discharges into the Diffuser Pond (Outfall101). The permittee is not required to monitor discharge through IMP 107 for routine decanting of accumulated stormwater.*

*During the process of closing the Metal Cleaning Waste Treatment Ponds, all monitoring requirements at IMP107 shall be waived to facilitate complete dewatering. During the dewatering process, samples shall be collected at Outfall 101 for analysis of TSS, O&G, copper, iron, and flow to ensure the water quality of the receiving stream is protected. Due to the additional residence time within the Diffuser Pond, these parameters shall be monitored daily at Outfall 101 from the beginning of the dewatering event(s) through three days following termination of dewatering. All monitoring results shall be reported in the DMR for Outfall 101.*

### **D. Outfall 110 [Closed Mode Operations only]**

As described in the permit application, a discharge from Outfall 110 occurs only when the power plant operates in closed mode operation, which is infrequent. Operation in closed mode has been precluded because of operational restrictions that happen when the plant is operated in this [closed] mode; discharge from Outfall 110 is not anticipated to occur. Closed mode operation is when condenser-circulating water is cooled in the cooling towers and is then routed, via the cold-water return channel, to the intake forebay. Outfall 110 is a sampling point for water passing from the channel into the forebay. The discharge would consist of non-contact cooling water, including primarily condenser circulating water, the essential raw cooling water, and raw cooling water. Other waters would be from the liquid radwaste system, regeneration wastes from the condensate demineralizer, and steam generator blowdown.

Outfall 110 will be limited with the same permit limitations established for Outfall 101 when operated in closed mode only. If discharge occurs, the permittee will monitor and report on the discharge using the same sampling and analysis protocol(s) established for Outfall 101. When no discharge occurs, the permittee shall report "no discharge" on the Discharge Monitoring Report (DMR).

When the facility operates in closed mode, the mixing zone boundaries change to include the intake forebay. Mixing zone temperature compliance calculations only apply at Outfall 101, temperature will not be limited for Outfall 110 discharges.

#### E. Outfalls 116 and 117

These discharges result from backwashing wastewater from the screens and strainers of the water intake for Condenser Circulating Water (CCW), (Outfall 116) and the intake for Essential Raw Cooling Water (ERCW) (Outfall 117).

Previous permit conditions did not include numerical limitations or monitoring requirements, instead narrative requirements established that no materials were discharged except material previously present in the intake water, and that there shall be no visible sheen in the discharges.

Based on recurrent reports which do not indicate presence of pollutants in this backwash, monitoring will be deleted from the renewed permit.

#### F. Outfall 118

This outfall drains the Essential Raw Cooling Water dredge pond. Presently the pond is not in service and discharges small amounts of storm water are coming from its now-vegetated area.

The previous outfall limitations were established for discharges from the pond when it was in service, including limits and monitoring for settleable solids, TSS and dissolved oxygen. These limits became void after the pond was emptied of dredged water and vegetation established in the pond area.

The permit writer proposes that present permit limits be applied to discharges from the pond, if it is put back into service. Otherwise, no monitoring will be required. When no discharge occurs, the permittee shall report "no discharge" on the Discharge Monitoring Report (DMR).

#### SUMMARY OF PROPOSED PERMIT LIMITS – IMP 118

**Description : External Outfall, Number : 118, Monitoring : Effluent Gross, Season : All Year**

<b>Parameter</b>	<b>Qualifier</b>	<b>Limit</b>	<b>Unit</b>	<b>Sample Type</b>	<b>Frequency</b>	<b>Statistical base</b>
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Estimate	Once Per Batch	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Estimate	Once Per Batch	Monthly Average
Oxygen, dissolved (DO)	>=	2	mg/L	Grab	Twice Every Week	Minimum
Solids, settleable	<=	1	mL/L	Grab	Monthly	Daily Maximum
Solids, total suspended	<=	100	mg/L	Grab	Twice Every Week	Daily Maximum

#### G. Additional Limitations, Monitoring Requirements and Conditions

In addition to the specific numerical limitations discussed above, there are a number of general requirements that will apply to outfalls 101, 110, 116, 117, and 118 and internal monitoring points IMP 103, and IMP 107. These requirements are discussed as follows:

- i. 40 CFR Part 423.12 (b) (2) (BPT) and Part 423.13 (a) (BAT) specify, "There shall be no discharge of polychlorinated biphenyl compounds such as those commonly

used for transformer fluid.” This requirement was in the previous permit and will be retained in the new permit.

- ii. 40 CFR Part 423.12 (b) (8) (BPT requirements, non wastewater source specific) states that “Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available chlorine or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.”
- iii. 40 CFR Part 423.13 (b) (2) (BAT requirements, specific to once through cooling water) also states that for plants with a rated electric generating capacity of 25 or more megawatts that “Total residual chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.”
- iv. 40 CFR Part 423.13 (d) (2) (BAT requirements, specific to cooling tower blowdown) states “Neither free available nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.”

These requirements are potentially applicable to Outfalls 101 (and Outfall 110 in Closed Mode). Chlorine is not added to the Condenser Circulating Water System (once through cooling water), or to the high-pressure fire protection system, (when flushed), at the Sequoyah Nuclear Plant who's discharge is primarily through Outfall 101. With regard to cooling tower blowdown, TVA has made a demonstration to the Division that the facility cannot operate the cooling towers under these requirements without significant damage to the system potentially jeopardizing operational safety. **These requirements were not in the previous permit and will not be included in the new permit.**

- v. 40 CFR Part 423.13 (d) (1), BAT requirements for cooling tower blowdown, establishes monthly average and daily maximum effluent limitations for the 126 Priority Pollutants. The monthly average limit and the daily maximum limit (except for chromium and zinc) is “No Detectable Amount.” However, Part 423.13 (d) (3) allows the permitting authority, at its discretion, to utilize engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by analytical methods in 40 CFR Part 136. This requirement is potentially applicable to outfall 101. TVA has provided data that demonstrates that priority pollutants will not be added to the system in quantities that will be detectable in cooling tower blowdown. Also the data provided with the Form 2C permit application indicates that the priority pollutants were not

present in detectable amounts. The following general statement will be added to the permit "Priority Pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the Priority Pollutants will not be required."

- vi. Bromine products may be used at times in the raw water system. For purposes of measurement of Total Residual Chlorine (TRC) in the permit, analyses shall include residual bromine with the results reported as chlorine. Thus there is no separate test for residual bromine, but one test for situations where combinations of chlorine and bromine are being used.
- vii. It is recognized that the permittee must use biocides and corrosion inhibitor products to properly operate the facility. Because the chemicals in these products may be detrimental to fish and aquatic life in the receiving stream, there is a need to evaluate the nature of the chemicals, the dosage to be used, the duration of use, the effluent concentration, and the need for treatment prior to discharge. Previous permits addressed biocide/slimicide and corrosion inhibitor products use at the site for process and non-process flows in the BMP program. A program for managing the use of these products has been developed under the Biocide/Corrosion Treatment Plan (B/CTP). The permittee shall not conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals except in accordance with conditions specified under the written B/CTP [plan], which has been given prior approval on April 27, 2005 (or other revisions), by the Division of Water Resources. The mechanism to alter these applications is by formally amending the B/CTP.

#### VIII. Water Quality Based Calculations for METALS AND TOXICS

The primary concern for aquatic toxicity from SQN discharges relates to use of **biocides or oxidizers such as chlorine**. The following procedure is used to calculate the allowable instream concentrations for metals and toxics permit limitations.

1. The most recent background conditions of the receiving stream segment for Outfall 101 were compiled using this information:
  - \* 1Q10 of receiving stream (3491 MGD)
  - \* Calcium hardness (measured ambient data (50 mg/L))
  - \* Total suspended solids (10 mg/l, default)
  - \* Background metals concentrations (measured ambient data)
  - \* Other dischargers impacting this segment
  - \* Downstream water supplies, if applicable
2. The chronic water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.

3. The acute water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel, zinc, silver and mercury. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel, silver and mercury.
4. The chronic criteria for Chromium (T) are given in the total recoverable form and are not converted to a dissolved lab condition or to the total recoverable ambient condition.
5. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of 90%.

The following equations are used to evaluate **water quality protection**:

$$\text{Eqn: } C_m = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

where:

$C_m$  = resulting in-stream concentration after mixing

$C_w$  = concentration of pollutant in wastewater

$C_s$  = stream background concentration

$Q_w$  = wastewater flow

$Q_s$  = stream low flow

**to protect water quality:**

$$\text{Eqn: } C_w \leq \frac{(S_A) [C_m (Q_s + Q_w) - Q_s C_s]}{Q_w}$$

where:  $(S_A)$  = the percent "Stream Allocation".

WATER QUALITY BASED EFFLUENT CALCULATIONS OUTFALL 101							
<b>FACILITY:</b> <u>Sequoyah Nuclear Plant</u> <b>PERMIT #:</b> <u>TN0026450</u>							
Stream (1Q10)	Stream (3Q05)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO <sub>3</sub> )	Stream Allocation		
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]		
3483.0	7740.0	1491.0	10	50	90		

EFFLUENT CHARACTERISTIC	1	2	3	4	5	6	7	8
	Stream	Fish/Aqua. Life		Effluent	Fish & Aquatic Life Water Quality Criteria (1Q20)			
	Bckgrnd.	Water Quality Criteria		Fraction	In-Stream Allowable		Calc. Effluent Concentration	
	Conc.	Chronic	Acute	Dissolved	Chronic	Acute	Chronic	Acute
	[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
Chlorine (T. Res.)	0.0	11.0	19.0	1.0	11.0	19.0	33.03	57.05

EFFLUENT CHARACTERISTIC	9	10	11	12	13	14
	Human Health Water Quality Criteria (3Q02)					
	In-Stream Criteria			Calc. Effluent Concentration		
	Organisms	Water/Organism	DWS	Organisms	Water/Organism	DWS
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
Chlorine (T. Res.)	NA	NA	NA	NA	NA	NA

NOTE: Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 3Q05 flow.

Calculations for this permit have been made using a standardized worksheet titled "Water Quality Based Effluent Calculations", shown below.

Division policy dictates the following procedures in establishing these permit limits:

- The critical low flow values are determined using USGS data:

Fish and Aquatic Life Protection

7Q10 - Low flow under natural conditions

1Q10 - Regulated low flow conditions

Other than Fish and Aquatic Life Protection

3Q02 - Low flow under natural conditions

- Fish & Aquatic Life water quality criteria for certain Metals are developed through application of hardness dependent equations. These criteria are combined with dissolved fraction methodologies in order to formulate the final effluent concentrations.
- For criteria that are hardness dependent, chronic and acute concentrations are based on a Hardness of 50 mg/L and Total Suspended Solids (TSS) of 10 mg/L unless STORET or Water Supply intake data substantiate a different value. Minimum and maximum limits on the hardness value used for all water quality calculations are 25 mg/L and 400 mg/L respectively.
- Background concentrations are determined from the Division database, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic

"In-stream Allowable" water quality criteria for fish and aquatic life is used. If the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is replaced with the chronic "In-stream Allowable" water quality criteria for the purpose of calculating the appropriate effluent limitation (Cw). Under these circumstances, and in the event the "stream allocation" is less than 100%, the calculated chronic effluent limitation for fish and aquatic life should be equal to the chronic "In-stream Allowable" water quality criteria. These guidelines should be strictly followed where the industrial source water is not the receiving stream. Where the industrial source water is the receiving stream, and the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, consideration may be given as to the degree to which the permittee should be required to meet the requirements of the water quality criteria in view of the nature and characteristics of the receiving stream.

Each worksheet has fourteen (14) data columns, all of which may not be applicable to any particular characteristic constituent of the discharge. A description of each column is as follows:

**Column 1:** The "Stream Background" concentrations of the effluent characteristics.

**Column 2:** The "Chronic" Fish and Aquatic Life Water Quality Criteria. For Cadmium, Copper, Lead, Nickel, and Zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Continuous Concentration (CCC) is calculated using the equation:

$$\text{Eqn: } CCC = (\exp \{ m_C [ \ln (\text{stream hardness}) ] + b_C \} ) (CCF)$$

where: CCF = Chronic Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no chronic criteria exist for silver. Published criteria are used for non-metal parameters.

**Column 3:** The "Acute" Fish and Aquatic Life Water Quality Criteria. For Cadmium, Copper, Lead, Nickel, Silver, and Zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Maximum Concentration (CMC) is calculated using the equation:

$$\text{Eqn: } CMC = (\exp \{ m_A [ \ln (\text{stream hardness}) ] + b_A \} ) (ACF)$$

where: ACF = Acute Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no acute criteria exist for Total Chromium. Published criteria are used for non-metal parameters.

**Column 4:** The "Translator" converts the value for dissolved metal at laboratory conditions (columns 2 & 3) to total recoverable metal at in-stream ambient conditions (columns 5 & 6). This factor is calculated using the linear partition coefficients found in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996) and the equation:

$$\text{Eqn: } \frac{C_{\text{diss}}}{C_{\text{total}}} = \frac{1}{1 + \{ [K_{\text{po}}] [\text{ss}^{(1+a)}] [10^{-6}] \}}$$

where: ss = in-stream suspended solids concentration [mg/l]

Linear partition coefficients for streams are used for unregulated (7Q10) receiving waters, and linear partition coefficients for lakes are used for regulated (1Q10) receiving waters. For those parameters not in the dissolved form in columns 2 & 3 (and all non-metal parameters), a Translator of 1 is used.

- Column 5:** The "Chronic" Fish and Aquatic Life Water Quality Criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 2 by the value in column 4.
- Column 6:** The "Acute" Fish and Aquatic Life Water Quality Criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 3 by the value in column 4.
- Column 7:** The "Chronic" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the Chronic limit.
- Column 8:** The "Acute" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the Acute limit.
- Column 9:** The In-Stream Water Quality Criteria for the protection of Human Health associated with the stream use classification of Organism Consumption (Recreation).
- Column 10:** The In-Stream Water Quality Criteria for the protection of Human Health associated with the stream use classification of Water and Organism Consumption. These criteria are only to be applied when the stream use classification for the receiving stream includes both "Recreation" and "Domestic Water Supply."
- Column 11:** The In-Stream Water Quality Criteria for the protection of Human Health associated with the stream use classification of Domestic Water Supply.
- Column 12:** The Calculated Effluent Concentration associated with Organism Consumption.
- Column 13:** The Calculated Effluent Concentration associated with Water and Organism Consumption.
- Column 14:** The Calculated Effluent Concentration associated with Domestic Water Supply.

**NOTE:** The calculated chronic water quality effluent concentrations from Column 7 should be compared, individually, to the values calculated in Columns 12, 13, and 14 in order to determine the most stringent chronic permit limitations. The calculated acute water quality effluent concentrations from Column 8 should then be compared, individually, to values equal to two (2) times the values presented in Columns 12, 13, and 14 in order to determine the most stringent acute permit limitations. These water quality based limits are compared to any technology based (CFR or Tennessee "Rules") effluent limitations, and/or any previous permit limitations, for final determination of the permit limits. TVA has demonstrated that Priority Pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the Priority Pollutants will not be required.



#### IX. Storm Water

The Tennessee Multi-Sector General Storm Water Permit (TMSP) No.TNR050015 covers storm water discharges associated with the industrial activity of this facility. Storm water concerns associated with this facility are covered in this general permit, so they will not be addressed in detail in the individual NPDES permit.

Since it is the intent of the division that the permittee institutes a Storm Water Pollution Prevention Plan (SWPPP) in order to minimize the discharge of pollutants from storm water outfalls. It is the opinion of the division that the best method for dealing with potential pollution associated with storm water discharges from the TVA-Sequoyah Nuclear Plant facility is through implementation of an aggressive SWPPP coupled with the TMSP to verify SWPPP discharge monitoring effectiveness.

In order to assist the permittee in the evaluation of the effectiveness of the SWPPP, benchmark values developed for the TMSP for Industrial Activities are provided herein for comparison. These benchmark values (cut-off concentrations) were developed by the EPA and the State of Tennessee and are based on data submitted by similar industries for the development of the multi-sector general storm water permit. The cut-off concentrations are target values and should not be construed to represent permit limits.

Parameters of Concern	Cut-Off Concentration [mg/L]
<b><i>Total Suspended Solids (TSS)</i></b>	<b><i>200</i></b>
<b><i>Oil &amp; Grease</i></b>	<b><i>15</i></b>
<b><i>Iron, TOTAL</i></b>	<b><i>5.0</i></b>
<b><i>pH (range)</i></b>	<b><i>5.0 - 9.0</i></b>

Note: Sample values are from the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities, Rationale, Part III, Table III-A: *Parameter Benchmark Values*.

The new permit will contain a requirement that a Storm Water Pollution Prevention Plan be developed and maintained to regulate storm water runoff. This SWPPP is meant to ensure that runoff from the facility site is not a significant source of pollution to the receiving stream. The discharger will develop, document and maintain the SWPPP pursuant to the requirements as set forth in the Tennessee's Storm Water Multi-Sector General Permit for Industrial Activities, Sector O, "*Storm Water Discharges Associated with Industrial Activity from Steam Electric Power Generating Facilities, Including Coal Handling Areas*", Part 3, "*Storm Water Pollution Prevention Plan Requirements*", as included in the ATTACHMENT I of this permit also found at <http://www.state.tn.us/environment/wpc/stormh2o/pmt-o.pdf>. The effectiveness of this SWPPP will be examined by requiring storm water monitoring data be submitted of the combined process/storm water discharges. At that time, should the results so dictate, the division maintains the authority to institute specific numeric limitations for the monitored parameters.

## X. BIOMONITORING REQUIREMENTS, CHRONIC

The discharge of industrial wastewater from Outfall 101 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Tennessee Water Quality Standards criteria stipulate that *"The waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions..."*.

Where the stream is the source, calculation of toxicity limits follows:

$$\text{Dilution Factor} = \frac{Q_s}{Q_w}$$

where: **Q<sub>w</sub>** is a wastewater flow (Q<sub>w</sub> = 1491 MGD) and **Q<sub>s</sub>** is a receiving stream low flow (1Q10, estimated at 3491 MGD). Please refer to Appendix 1 for specific details regarding facility discharge and receiving stream.

Therefore, IWC is Instream Waste Concentration and is calculated using the following formula:

$$\text{IWC} - \frac{Q_w}{Q_s} \times 100 - \text{Instream Waste Concentration}$$

Where:  $\text{IWC} \leq 1.0 \times \text{IC}_{25}$ ; or, INHIBITION CONCENTRATION, 25%  $\geq$  IWC

Thus,

$$\text{IWC} - \frac{1491}{3491} \times 100 = 42.8\%$$

Specifically:

WET testing will now be required on 42.8 % effluent based on new flow data provided with this permit renewal application. Toxicity demonstrated in any of the effluent samples as specified above will serve as a trigger for accelerated monitoring.

The toxicity tests specified herein for Outfall 101 shall be conducted according to the B/CTP and begin during the first chemical application requiring biomonitoring following the effective date of this permit. WET frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring, monthly reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP, monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or electronic report (if being used) to reflect that monitoring is not required.

## XI. OTHER REQUIREMENTS

### A. BEST MANAGEMENT PRACTICES

Best management practices are included in the permit. Best management practices will apply to the activity that is likely to cause or contribute to pollution of the state's waters. The best management practices under this permit may be combined into a single document with the storm water pollution prevention plan (SWPPP) required under the TMSP general permit TNR050015 if the permittee wishes.

Liquid radwaste is treated by a Liquid Radwaste System and discharged into the cooling channel. The water discharged is mixed with the cooling water and discharged through Outfall 101. Liquid radwaste treatment is to collect and treat those liquids, which are radioactive or potentially radioactive. The treatment typically includes activated carbon, cation exchange resins and a mixed bed resin. Chemical pollutant concerns are minimal, for this waste. Past data and process knowledge indicate that the effluent requirements for low volume wastes are met for this system. The liquid radwastes will be handled according to the TVA-SQN best management practices (BMP) plan.

Best management practices will be included for toxics and hazardous materials control as well as pollutants defined under the Tennessee Water Quality Control Act. The BMP plan shall also include:

1. Biocide treatments for in-plant systems and an approved mechanism for notification and Division approval that should not delay changes needed to protect both the systems of the facility and all manner of plant and aquatic life in waters of the State. This shall be accomplished by amending the B/CTP, but will not require permit modification.
2. Construction and repairs with potential for pollution contributions that are not routed to an appropriate treatment system.
3. Housekeeping and maintenance standard practices manuals.
4. Minimization of pollutants that could result from the backwash activities at Outfall 116 and Outfall 117.

## **B. DIFFUSER DISCHARGE MODEL CALIBRATION**

Diffuser discharges are modeled and the model results used to determine compliance. The characteristics of the model and discharge situation may vary with time. In March 2013, TVA submitted an updated rating curve for computing the diffuser flowrate with acceptable results.

Therefore, calibration of the diffuser flows and the model will continue to be conducted as in the previous permit. For this permit period, such calibration shall be coordinated with the evaluation of the thermal numerical modeling discussed below.

## **C. STUDY TO CONFIRM CALIBRATION OF NUMERICAL MODEL**

The numerical model used to determine compliance with the temperature requirements for Outfall 101 shall be the subject of a calibration study once during the permit cycle. In April 2013, TVA provided a study that confirmed the calibration of the model.<sup>10</sup>

The study should be accomplished in time for data to be available for the next permit application for re-issuance of the permit. A report of the study will be presented to the Division of Water Resources. Any adjustments to the numerical model to improve its accuracy will not need separate approval from the Division of Water Resources; however, the Division will be notified when such adjustments are made.

## **XII.. ANTIDegradation**

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06. It is the purpose of Tennessee's standards to fully protect existing uses of all surface waters as established under the Act.

Stream determinations for this permit action are associated with the waterbody segment identified by the division as segment ID# TN06020001020\_1000.

Available Conditions Waters (meeting designated uses):

The division has made a determination of the receiving waters associated with the subject discharge(s) and has found the receiving stream to be available conditions waters. Available conditions exist where water quality is better than the applicable criterion for a specific parameter. The department has maintained, and shall continue to assess, the water quality of the stream to assure that the water quality is adequate to protect the existing uses of the stream fully, and to assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

TMDLs have been developed and approved for this waterbody segment on the following parameters and dates:

<u>Parameter</u>	<u>TMDL Approval Date</u>
Siltation and Habitat Alteration	2006
E Coli	2010

The proposed terms and conditions of this permit comply with the wasteload allocations of these TMDLs.

## **XIII. . PERMIT DURATION**

The proposed limitations meet the requirements of Section 301(b)(2)(A), (C), (D), (E), and (F) of the Clean Water Act as amended. It is the intent of the division to organize the future issuance and expiration of this particular permit such that other permits located in the same watershed and group within the State of Tennessee will be set for issuance and expiration at the same time. In order to meet the target reissuance date for the Lower Tennessee River watershed and following the directives for the Watershed Management Program initiated in January, 1996, the permit will be issued to expire in 2018.

## APPENDIX 1 – FACILITY DISCHARGES AND RECEIVING WATERS

### FACILITY DISCHARGES AND RECEIVING WATERS

#### OUTFALL 101

LONGITUDE	LATITUDE
85-05-14	35-12-35

FLOW (MGD)	DISCHARGE SOURCE
1447.0000	Condenser Circulating Water ("Open" mode)
40.4100	Essential Raw Cooling Water (ERCW)
2.1250	Yard Drainage Pond (9.5 Mil Gal)
	(incl. bldg. sumps, misc. air conditioner cooling water
	auxiliary bldg. cooling water, misc. waters, and
	storm water runoff from 186.4 acres of property)
1.1900	Low Volume Waste Treatment Pond
	(10 Mil Gal. Pond; Outfall 103)
<b>1490.7250</b>	<b>TOTAL DISCHARGE*</b>

#### RECEIVING STREAM

##### DISCHARGE ROUTE

Tennessee River at mile 483.65

STREAM LOW FLOW (CFS) *	7Q10	1Q10	3Q2
	6250.000	5400.000	8490.000
(MGD)	4040.6	3491.1	5488.8

#### STREAM USE CLASSIFICATIONS (WATER QUALITY)

FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X	X			

Outfall 101 identifies discharge from the Diffuser Pond to the Tennessee River and is the primary discharge of the facility.

\*Note that the total discharge value may differ slightly from the schematic provided with the application, and the number used for other calculations. The Diffuser Pond receives discharges from IMP 103 and IMP 107.

**APPENDIX 1 (continued)**

**FACILITY DISCHARGES AND RECEIVING WATERS**

Internal Monitoring Point

OUTFALL 103	
LONGITUDE	LATITUDE

FLOW (MGD)	DISCHARGE SOURCE
1.1371	Condensate Demineralizer (Con DI)
	demineralizer, turbine, building sump and storm water runoff
<b>1.1371</b>	<b>TOTAL DISCHARGE</b>

RECEIVING STREAM DISCHARGE ROUTE			
Discharge to Diffuser pond (Outfall 101) to the Tennessee River			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	NA	NA	NA
(MGD)	0.0	0.0	0.0

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Varies from none to neutralization. Final treatment is provided by sedimentation and oil skimming in a 10 million gallon pond

\* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Outlaw and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority, Nashville, Tennessee, 1996.

**FACILITY DISCHARGES AND RECEIVING WATERS**

Internal Monitoring Point

OUTFALL 107	
LONGITUDE	LATITUDE

FLOW (MGD)	DISCHARGE SOURCE
0.0025	Metal cleaning wastewater and storm water runoff
<b>0.0025</b>	<b>TOTAL DISCHARGE</b>

RECEIVING STREAM DISCHARGE ROUTE			
Water is pumps into condenser circulating water channel which drains to the Diffuser Pond (Outfall 101) or is pumped to Low Volume Waste Treatment Pond (Outfall 103) which drains into the Diffuser Pond and then to the Tennessee River			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	NA	NA	NA
(MGD)	NA	NA	NA

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Sedimentation, neutralization, aeration and chemical precipitation into one-million gallon pond series

\* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Outlaw and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority, Nashville, Tennessee, 1996.

APPENDIX 1 (continued)

FACILITY DISCHARGES AND RECEIVING WATERS																													
<b>OUTFALL 116</b>																													
LONGITUDE	LATITUDE																												
85-05-13	35-13-33																												
FLOW (MGD)	DISCHARGE SOURCE																												
0.060	Washwater from the																												
	Condenser Circulating Water Trash Sluice																												
<b>0.0600</b>	<b>TOTAL DISCHARGE</b>																												
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<p>This is an intermittent discharge from the backwash of debris from screen and strainers of the Condenser Cooling Water system to an embayment of the Tennessee River north of the power plant.</p>																													

FACILITY DISCHARGES AND RECEIVING WATERS																													
<b>OUTFALL 117</b>																													
LONGITUDE	LATITUDE																												
85-05-03	35-13-32																												
FLOW (MGD)	DISCHARGE SOURCE																												
0.0140	Backwash of the Essential Raw Water																												
	Intake Screen and Strainer																												
<b>0.0140</b>	<b>TOTAL DISCHARGE</b>																												
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**APPENDIX 1 (continued)**

FACILITY DISCHARGES AND RECEIVING WATERS																													
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">OUTFALL 118</th> </tr> <tr> <th style="width: 50%;">LONGITUDE</th> <th style="width: 50%;">LATITUDE</th> </tr> <tr> <td style="text-align: center;">85-05-03</td> <td style="text-align: center;">35-13-32</td> </tr> </table>					OUTFALL 118		LONGITUDE	LATITUDE	85-05-03	35-13-32																			
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<p>Discharge from the Essential Raw Cooling Water dredge pond is inactive, except for storm water runoff from the vegetated area.</p> <p>This pond could be used for temporary disposal of sediment dredged from intake channel providing water to the plant. Such dredging would be conducted when there is need to restore the channel depth to acceptable level.</p>																													



## APPENDIX 2 - APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

### 40 CFR PART 423 EFFLUENT LIMITATION GUIDELINES STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY

EFFLUENT CHARACTERISTIC	Low Volume Waste Sources			
	§423.12(b)(3) - BPT		§423.13 - BAT	
	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
TSS	30.0	100.0	--	--
Oil & Grease	15.0	20.0	--	--
pH	6.0 - 9.0	6.0 - 9.0	--	--

- Note: 1. The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed. At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified. Concentration limitations shall be those specified above.
2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

**APPENDIX 2**  
**APPLICABLE EFFLUENT LIMITATIONS GUIDELINES (continued)**

**40 CFR PART 423 EFFLUENT LIMITATION GUIDELINES  
STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY**

EFFLUENT CHARACTERISTIC	Metal Cleaning Wastes			
	§423.12(b)(5) - BPT		§423.13(e) - BAT	
	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
TSS	30.0	100.0	--	--
Oil & Grease	15.0	20.0	--	--
Copper (T)	1.0	1.0	1.0	1.0
Iron (T)	1.0	1.0	1.0	1.0
pH	6.0 - 9.0	6.0 - 9.0	--	--

\* Applicable to chemical metal cleaning wastes.

- Note: 1. The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed. At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified. Concentration limitations shall be those specified above.
2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.
3. §423.12 refers to metal cleaning wastes while §423.13 refers to chemical metal cleaning wastes only.

**APPENDIX 2**  
**APPLICABLE EFFLUENT LIMITATIONS GUIDELINES (continued)**

**40 CFR PART 423 EFFLUENT LIMITATION GUIDELINES  
STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY**

EFFLUENT CHARACTERISTIC	Once Through Cooling Water			
	§423.12(b)(6) - BPT		§423.13(b) - BAT	
	Average Concentration	Maximum Concentration	Average Concentration	Maximum Concentration
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
Free Available Chlorine	0.2 *	0.5 *	0.2 *	0.5 *
Total Residual Chlorine	--	--	--	0.20 **

\* §423.12 is applicable to all plants. §423.13 is applicable to plants with a total rated electric generating capacity of less than 25 megawatts only. Neither free available chlorine nor total residual chlorine may be discharged from any single generating unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the permitting authority that the units in a particular location cannot operate at or below this level of chlorination.

\*\* Plant with a total rated electric generating capacity of 25 or more megawatts only. Total residual chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.

- Note: 1. The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of once through cooling water times the concentration listed. At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified. Concentration limitations shall be those specified above.
2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

### APPENDIX 3 - PREVIOUS PERMIT LIMITS

#### PERMIT LIMITS

##### OUTFALL 101

Condenser Cooling Water, Essential Raw Cooling Water, Cooling Tower Blowdown, Raw Cooling Water, Low Volume Wastes, Metal Cleaning Waste, Sanitary Wastewater, Miscellaneous Low Volume Wastes, including Various Facilities Drains and Sumps, A/C Condensate, Steam Generator Blowdown, High Pressure Fire Protection water, Regeneration Wastes From Condensate Demineralizer, and Storm Water Runoff

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	--	--	Report (MGD)		Continuous	Recorder <sup>1</sup>
AMBIENT TEMP.	--	--	Report (Deg.C)		Continuous	Calculate <sup>2</sup>
RIVER TEMP.	--	--	30.5 Deg.C		Continuous	Modeled <sup>2</sup>
CHLORINE (Ttl.Res.)	0.036	--	0.0580	--	5/Week	Calculate <sup>2</sup>
PCB's	NO DISCHARGE		NO DISCHARGE		Annually	Grab
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Week	Grab
OIL AND GREASE	15	--	20	--	1/Week	Grab
TSS	30	--	100	--	1/Week	Grab
IC25	Survival, Reproduction, & Growth in 43.9% Effluent				1/Quarter	Composite <sup>3</sup>

Samples taken in compliance with the monitoring requirements specified above shall be taken as follows: Flow - sampled at diffuser gate prior to entry to the Tennessee River; Ambient Temperature - river side of the plant intake skimmer wall; River Temperature - river temperature, temperature rise, and rate of temperature change shall be determined by numerical model.

<sup>1</sup> Measurements shall be made every 15 minutes at the 1-meter, 1.5-meter, and 2-meter depths and the data transmitted to the plant. Temperatures at the three depths shall be averaged every 15 minutes to give a temperature at the 1.5-meter depth. Both 1-hour and 24-hour averages shall be determined every 15 minutes for the Ambient Temperature and River Temperature (i.e., running averages). The 1-hour average shall be computed by averaging the current value and the previous four 15-minute values. The 24-hour average shall be computed by averaging 15-minute values over 24 hours.

<sup>2</sup> See text below table for further information.

<sup>3</sup> See part III for further description of toxicity tests.

## PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

### PERMIT LIMITS

#### OUTFALL 103

Demineralizer Regeneration from Plant 2 Demineralizer, Turbine Building Sump, Treated Metal  
Cleaning Waste from Outfall 107 and Storm Water Runoff

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD)		Report (MGD)		Recorder	Totalizer
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		3/Week	Grab
OIL AND GREASE	15	190	20	250	1/Week	Grab
TSS	30	380	100	1250	1/Week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):  
Treatment Pond discharge prior to mixing with other waste streams.

Note: In the event that the Turbine Building Sump is discharged directly to the CCW Channel or the yard drainage pond,  
TSS, Oil and Grease, and pH shall be monitored 5/Week.

(continued)

### PERMIT LIMITS

#### OUTFALL 107

Metal Cleaning Wastewater and Storm Water Runoff

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/batch)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/batch)		
FLOW	Report (MGD)		Report (MGD)		1/Day	Calculation
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Day	Grab
OIL AND GREASE	--	--	15	--	1/Day	Grab
TSS	--	--	30	--	1/Day	Composite
COPPER (T)	--	--	1.0	--	1/Day	Composite
IRON (T)	--	--	1.0	--	1/Day	Composite
PHOSPHOROUS (P) <sup>1</sup>	--	--	1.0	--	1/Day	Composite

Metal cleaning waste shall mean any cleaning compounds, rinse waters or any other waterborne residues derived from cleaning any metal process equipment.

Metal cleaning waste shall not be discharged into a pond(s) before all non-metal cleaning liquids have been removed to the extent practical without discharging previously removed solids.

In the event that metal cleaning wastes must be processed and discharged through the liquid radwaste system, the limitations and monitoring requirements above shall apply to the discharge from the liquid radwaste system prior to mixing with the Cooling Tower Blowdown.

There shall be no distinct discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):  
Discharge from the individual pond(s) prior to mixing with any other waste stream.

<sup>1</sup> Limitations and monitoring requirements shall apply only if phosphorous bearing cleaning solutions are used.

**PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS  
(continued)**

**PERMIT LIMITS**

**OUTFALL 110**

Condenser Cooling Water, Essential Raw Cooling Water, Raw Cooling Water, Misc.

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/batch)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/batch)		
FLOW	Report (MGD)		Report (MGD)		1/Day	Calculation
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Day	Grab
OIL AND GREASE	--	--	15	--	1/Day	Grab
TSS	--	--	30	--	1/Day	Composite
COPPER (T)	--	--	1.0	--	1/Day	Composite
IRON (T)	--	--	1.0	--	1/Day	Composite
PHOSPHOROUS (P) <sup>1</sup>	--	--	1.0	--	1/Day	Composite

Metal cleaning waste shall mean any cleaning compounds, rinse waters or any other waterborne residues derived from cleaning any metal process equipment.

Metal cleaning waste shall not be discharged into a pond(s) before all non-metal cleaning liquids have been removed to the extent practical without discharging previously removed solids.

In the event that metal cleaning wastes must be processed and discharged through the liquid radwaste system, the limitations and monitoring requirements above shall apply to the discharge from the liquid radwaste system prior to mixing with the Cooling Tower Blowdown.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):  
Discharge from the individual pond(s) prior to mixing with any other waste stream.

<sup>1</sup> Limitations and monitoring requirements shall apply only if phosphorous bearing cleaning solutions are used.

## PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (continued)

### PERMIT LIMITS

#### OUTFALLS 116 and 117

Outfall 116: Backwash from the Intake for Condenser Cooling Water  
Outfall 117: Backwash from the Intake for Emergency Raw Cooling Water Screen

These discharges are permitted without chemical monitoring requirements.

There shall be no discharge of floating materials other than those previously present in the intake water.

The discharge shall not have a visible oil sheen.

The discharges shall be under the Best Management Practices to control trash and debris.

### PERMIT LIMITS

#### OUTFALL 118

Settling Pond for Dredged Material from Intake Forebay  
(Only applicable when the pond is in service)

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC.	AVG. AMNT.	MAX. CONC.	MAX. AMNT.		
	(mg/l)	(lb/batch)	(mg/l)	(lb/batch)		
FLOW	Report (MGD)		Report MGD		1/Batch	Estimate
SETTLEABLE SOLIDS	--	--	1.0 ml/l	--	1/30	Grab <sup>1</sup>
TSS	--	--	100	--	2/7	Grab <sup>1</sup>
Dissolved Oxygen	--	--	2.0 Minimum	--	2/7	Grab <sup>1</sup>

There shall be no discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken of a discharge from the settling pond prior to mixing with the Intake Forebay.

<sup>1</sup> Grab samples shall be taken at these frequencies, including a grab sample to be taken immediately prior to termination of the batch discharge.

These effluent limitations and monitoring requirements only apply at times this settling pond contains is in use as settling basin for dredged sediment. Best management practices shall be used to control runoff from the pond. Examples include vegetative cover, silt fences, and/or hay bales.

## APPENDIX 4 - HISTORICAL MONITORING AND INSPECTION

### Outfall 101

PARAMETER	FLOW	TSS	TRC	BORON	PH	TEMP DIFF	TEMP RATE	RIVER TEMP
Units	MGD	mg/l	mg/l	mg/l	SU	deg C	deg C	deg C
Maximum	1787	38	0.056	1.5	8.52	4.8	2	31.3
Minimum	498	1	0	0.2	6.85	-1.1	-2.1	4.9
Average	1509.64	5.42	0.01	0.22		1.61	0.09	19.87
Median	1578	5	0.011	0.2	7.57	1.6	0.1	20.4
Count	3897	674	4133	106	914	3893	3893	3893

### Outfall 103

PARAMETER	FLOW	TSS	OIL & GREASE	PH
Units	MGD	mg/l	mg/l	SU
Maximum	3.621	43	11	9.29
Minimum	0	1	5	6.23
Average	1.14	9.87	5.25	
Median	1.146	9	5	7.75
Count	3895	709	722	1809

### Outfall 107

PARAMETER	FLOW	TSS	OIL & GREASE	PH	COPPER	IRON
Units	MGD	mg/l	mg/l	SU	mg/l	mg/l
Maximum	0.082	19	6.2	8.99	0.023	1.8
Minimum	0.012	1	5	7.26	0.001	0.03
Average	0.03	3.55	5.03		0.00	0.31
Median	0.032	3	5	8.35	0.002	0.19
Count	163	163	164	165	164	169



**APPENDIX 5a - NEW PERMIT LIMITS AND MONITORING REQUIREMENTS**  
**WATER QUALITY BASED EFFLUENT CALCULATIONS**

WATER QUALITY BASED EFFLUENT CALCULATIONS OUTFALL 101							
FACILITY: <u>Sequoyah Nuclear Plant</u> PERMIT #: <u>TN0026450</u>							
Stream (1Q10)	Stream (30Q5)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO3)	Stream Allocation		
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]		
3491.0	7740.0	1491.0	10	50	90		

	1	2	3	4	5	6	7	8
<b>EFFLUENT CHARACTERISTIC</b>	Stream	Fish/Aqua. Life		Effluent	Fish & Aquatic Life Water Quality Criteria (1Q20)			
	Bckgmd.	Water Quality Criteria		Fraction	In-Stream Allowable		Calc. Effluent Concentration	
	Conc.	Chronic	Acute	Dissolved	Chronic	Acute	Chronic	Acute
	[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
	Chlorine (T. Res.)	0.0	11.0	19.0	1.0	11.0	19.0	33.08

	9	10	11	12	13	14
<b>EFFLUENT CHARACTERISTIC</b>	Human Health Water Quality Criteria (30Q2)					
	In-Stream Criteria			Calc. Effluent Concentration		
	Organisms	Water/Organism	DWS	Organisms	Water/Organism	DWS
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
	Chlorine (T. Res.)	NA	NA	NA	NA	NA

NOTE: Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q5 flow.

## APPENDIX 5b - New Permit LIMITS

**Feature Description : External Outfall, Number : 101**

**Monitoring : Effluent Gross, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Chlorine, total residual	<=	.1	mg/L	Calculated	Weekdays	Daily Maximum
Chlorine, total residual	<=	.1	mg/L	Calculated	Weekdays	Monthly Average
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Recorder	Continuous	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Calculated	Daily	Monthly Average
Temperature, water deg. centigrade	Report	-	deg C	Calculated	Continuous	Daily Maximum
IC25 Static Renewal 7 Day Chronic Chrceriodaphnia	>=	42.8	%	Composite	Monthly	Minimum
IC25 Static Renewal 7 Day Chronic Chrpimephales	>=	42.8	%	Composite	Monthly	Minimum

**Monitoring : Effluent Gross, Season : Winter**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temp. Diff. between samp. & upstrm deg. C	<=	5	deg C	Calculated	Continuous	Daily Maximum

**Monitoring : Instream Monitoring, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temperature rate of change deg. C/hr	<=	2	deg C/hr	Calculated	Continuous	Daily Maximum
Temperature, water deg. centigrade	<=	30.5	deg C	Calculated	Continuous	Daily Maximum

**Monitoring : Instream Monitoring, Season : Summer**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Temp. Diff. between samp. & upstrm deg. C	<=	3	deg C	Calculated	Continuous	Daily Maximum

**New Permit Limits (continued)**

**Description : Internal Outfall, Number : 103, Monitoring : Effluent Gross, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Instantaneous	Weekly	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Instantaneous	Weekly	Monthly Average
Oil & Grease	<=	<b>20</b>	mg/L	Grab	Monthly	Daily Maximum
Oil & Grease	<=	<b>15</b>	mg/L	Grab	Monthly	Monthly Average
Solids, total suspended	<=	<b>100</b>	mg/L	Grab	Monthly	Daily Maximum
Solids, total suspended	<=	<b>30</b>	mg/L	Grab	Monthly	Monthly Average
pH	<=	<b>9</b>	SU	Grab	Weekly	Maximum
pH	>=	<b>6</b>	SU	Grab	Weekly	Minimum

**Description : External Outfall, Number : 118, Monitoring : Effluent Gross, Season : All Year**

<u>Parameter</u>	<u>Qualifier</u>	<u>Limit</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical base</u>
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Estimate	Once Per Batch	Daily Maximum
Flow, in conduit or thru treatment plant	Report	-	Mgal/d	Estimate	Once Per Batch	Monthly Average
Oxygen, dissolved (DO)	>=	<b>2</b>	mg/L	Grab	Twice Every Week	Minimum
Solids, settleable	<=	<b>1</b>	mL/L	Grab	Monthly	Daily Maximum
Solids, total suspended	<=	<b>100</b>	mg/L	Grab	Twice Every Week	Daily Maximum